FedRAMP™

Guide to OSCAL-Based FedRAMP® Security Assessment Plans (SAP) – Rev5

User Implementation Guide

Fedramp2.0.0-oscal1.0.x

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TEMPLATE REVISION HISTORY

Date	Version	Pages	Description	Author
06/30/2023	Fedramp2.0.0-oscal1.0.x	All	Initial release for FedRAMP rev 5 baselines SAP template.	FedRAMP PMO

How to contact us

For questions about FedRAMP, or for questions about this document including how to use it, contact info@FedRAMP.gov.

For more information about FedRAMP, see www.FedRAMP.gov.

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1 Overview

1.1 Who Should Use This Document?

This document is intended for technical staff and tool developers implementing solutions for importing, exporting, and manipulating Open Security Controls Assessment Language (OSCAL)-based FedRAMP Security Assessment Plans (SAPs) content.

It provides guidance and examples intended to guide an organization in the production and use of OSCAL-based FedRAMP-compliant SAP files. Our goal is to enable your organization to develop tools that will seamlessly ensure these standards are met so your security practitioners can focus on SAP content and accuracy rather than formatting and presentation.

1.2 Related Documents

This document does not stand alone. It provides information specific to developing tools to create and manage OSCAL-based, FedRAMP-compliant Security Assessment Plans.

Refer to the *Guide to OSCAL-based FedRAMP Content* for foundational information and core concepts.

The *Guide to OSCAL-based FedRAMP Content*, contains foundational information and core concepts, which apply to all OSCAL-based FedRAMP guides. This document contains several references to that content guide.

Also, the OSCAL-based FedRAMP SAP builds on the content expressed in the OSCAL-based System Security Plan (SSP). As a result, this document contains several references to the *Guide to OSCAL-based System Security Plans (SSP)*.

1.3 Basic Terminology

XML and JSON use different terminology. Instead of repeatedly clarifying format-specific terminology, this document uses the following format-agnostic terminology through the document.

TERM	XML EQUIVALENT	JSON EQUIVALENT
Field	A single element or node that can hold a value or an attribute	A single object that can hold a value or property

Flag	Attribute	Property
Assembly	A collection of elements or nodes. Typically, a parent node with one or more child nodes.	A collection of objects. Typically, a parent object with one or more child objects.

These terms are used by National Institute of Standards and Technology (NIST) in the creation of OSCAL syntax.

Throughout this document, the following words are used to differentiate between requirements, recommendations, and options.

TERM	MEANING
must	Indicates a required action.
should	Indicates a recommended action but not necessarily required.
may	Indicates an optional action.

2 FedRAMP Extensions and Allowed Values

NIST designed the core OSCAL syntax to model cybersecurity information that is common to most organization and compliance frameworks; however, NIST also recognized the need to provide flexibility or organizations with unique information needs.

A summary of the FedRAMP extensions and allowed values appears in the FedRAMP OSCAL Registry.

Instead of trying to provide a language that meets each organization's unique needs, NIST provided designed OSCAL with the ability to be extended.

As a result, FedRAMP-compliant OSCAL files are a combination of the core OSCAL syntax and extensions defined by FedRAMP. The *Guide to OSCAL-Based FedRAMP Content* describes the concepts behind FedRAMP extensions and allowed values. The extensions related to the Security Assessment Plan (SAP) are cited in this document in context of their use.

These concepts are described in the Guide to OSCAL-based FedRAMP

FedRAMP extensions and allowed values are cited in relevant portions of this document and summarized in the FedRAMP OSCAL Registry.

Revised FedRAMP Registry Approach

The FedRAMP OSCAL Registry was originally provided as a spreadsheet. It now uses the draft OSCAL Extensions syntax and is offered in XML and JSON formats, with a human-readable HTML representation. This enables tools to be extension aware.

- *XML Version*
- *JSON Version*
- *HTML Version*

3 Working with OSCAL Files

This section provides a summary of several important concepts and details that apply to OSCAL-based FedRAMP SAP files.

The *Guide to OSCAL-based FedRAMP Content* provides important concepts necessary for working with any OSCAL-based FedRAMP file. Familiarization with those concepts is important to understanding this guide.

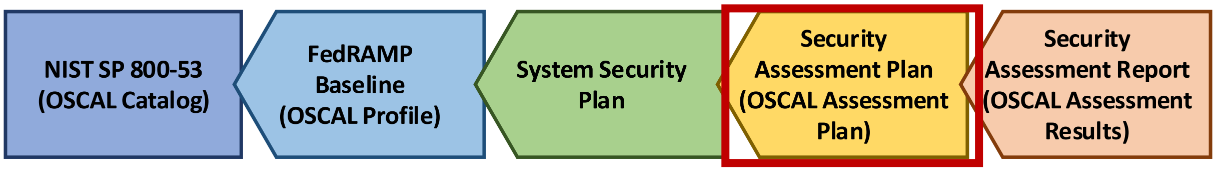
3.1 XML and JSON Formats

The examples provided here are in XML; however, FedRAMP accepts XML or JSON formatted OSCAL-based SAP files. NIST offers a utility that provides lossless conversion of OSCAL-compliant files between XML and JSON in either direction.

You may submit your SAP to FedRAMP using either format. If necessary, FedRAMP tools will convert the files for processing.

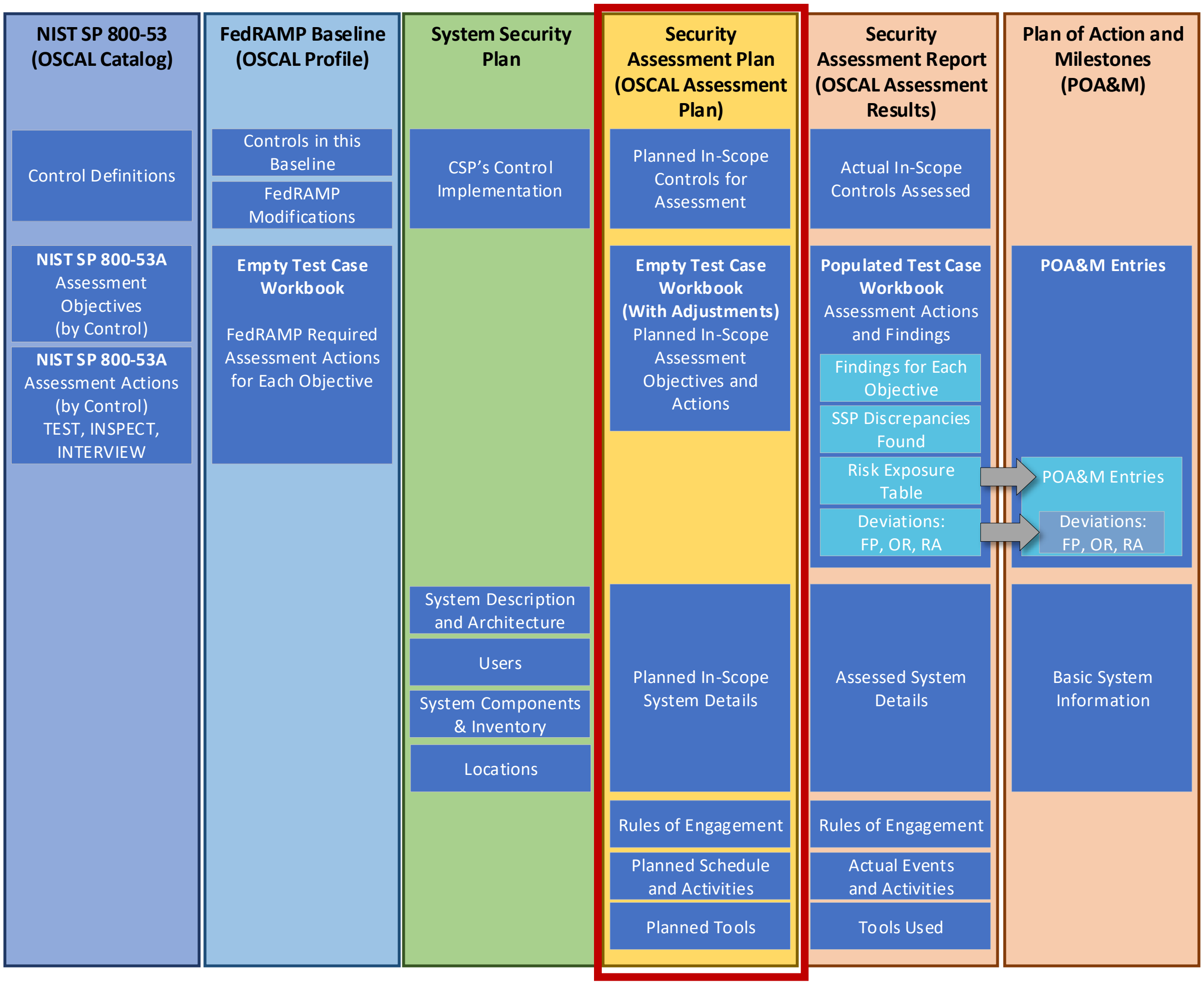
3.2 SAP File Concepts

Unlike the traditional MS Word-based SSP, SAP, and SAR, the OSCAL-based versions of these files are designed to make information available through linkages, rather than duplicating information. In OSCAL, these linkages are established through `import` commands.


NIST SP 800-53 (OSCAL Catalog)
FedRAMP Baseline (OSCAL Profile)
System Security Plan
Security Assessment Plan (OSCAL Assessment Plan)
Security Assessment Report (OSCAL Assessment Results)

Each OSCAL file imports information from the one to the left

For example, the assessment objectives and actions that appear in a blank test case workbook (TCW), are defined in the FedRAMP profile, and simply referenced by the SAP and SAR. Only deviations from the TCW are captured in the SAP or SAR.


NIST SP 800-53 (OSCAL Catalog)
Control Definitions
NIST SP 800-53A Assessment Objectives (by Control)
NIST SP 800-53A Assessment Actions (by Control) TEST, INSPECT, INTERVIEW
FedRAMP Baseline (OSCAL Profile)
Controls in this Baseline
FedRAMP Modifications
Empty Test Case Workbook
FedRAMP Required Assessment Actions for Each Objective
System Security Plan
CSP's Control Implementation
System Description and Architecture
Users
System Components & Inventory
Locations
Security Assessment Plan (OSCAL Assessment Plan)
Planned In-Scope Controls for Assessment
Empty Test Case Workbook (With Adjustments)
Planned In-Scope Assessment Objectives and Actions
Planned In-Scope System Details
Rules of Engagement
Planned Schedule and Activities
Planned Tools
Security Assessment Report (OSCAL Assessment Results)
Actual In-Scope Controls Assessed
Populated Test Case Workbook
Assessment Actions and Findings
Findings for Each Objective
SSP Discrepancies Found
Risk Exposure Table
Deviations: FP, OR, RA
Assessed System Details
Rules of Engagement
Actual Events and Activities
Tools Used
Plan of Action and Milestones (POA&M)
POA&M Entries
POA&M Entries
Deviations: FP, OR, RA
Basic System Information

Baseline and SSP Information is referenced instead of duplicated.

For this reason, an OSCAL-based SAP points to the OSCAL-based SSP of the system being assessed. Instead of duplicating system details, the OSCAL-based SAP simply points to the SSP content for information such as system description, boundary, users, locations, and inventory items.

The SAP also inherits the SSP's pointer to the appropriate OSCAL-based FedRAMP Baseline. Through that linkage, the SAP references the assessment objectives and actions typically identified in the FedRAMP TCW.

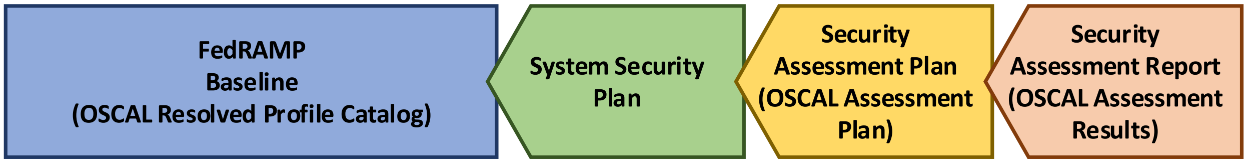
The only reason to include this content in the SAP is when the assessor documents a deviation from the SSP, Baseline, or TCW.

3.2.1 Resolved Profile Catalogs

The resolved profile catalog for each FedRAMP baseline is produced by applying the FedRAMP profiles as a set of tailoring instructions on top of the NIST control catalog. This reduces overhead for tools by eliminating the need to open and follow references from the profile to the catalog. It also includes only the catalog information relevant to the baseline, reducing the overhead of opening a larger catalog.

Where available, tool developers have the option of following the links from the profile to the catalog as described above or using the resolved profile catalog.

Developers should be aware that at this time catalogs and profiles remain relatively static. As OSCAL gains wider adoption, there is a risk that profiles and catalogs will become more dynamic, and a resolved profile catalog becomes more likely to be out of date. Early adopters may wish to start with the resolved profile catalog now, and plan to add functionality later for the separate profile and catalog handling later in their product roadmap.



The Resolved Profile Catalog for each FedRAMP Baseline reduces tool processing.

For more information about resolved profile catalogs, see the *Guide to OSCAL-based FedRAMP Content* *Appendix C, Profile Resolution*.

3.3 OSCAL-based FedRAMP SAP Template

FedRAMP offers an OSCAL-based SAP shell file in both XML and JSON formats. This shell contains many of the FedRAMP required standards to help get you started. This document is intended to work in concert with that file. The OSCAL-based FedRAMP SAP Template is available in XML and JSON formats here:

- OSCAL-based FedRAMP SAP Template (JSON Format): https://github.com/GSA/fedramp-automation/raw/master/dist/content/rev5/templates/sap/json/FedRAMP-SAP-OSCAL-Template.json
- OSCAL-based FedRAMP SAP Template (XML Format): https://github.com/GSA/fedramp-automation/raw/master/dist/content/rev5/templates/sap/xml/FedRAMP-SAP-OSCAL-Template.xml

3.4 OSCAL's SAP Minimum File Requirements

Every OSCAL-based FedRAMP SAP file must have a minimum set of required fields/assemblies and must follow the OSCAL Assessment Plan model syntax found here:

https://pages.nist.gov/OSCAL/documentation/schema/assessment-layer/assessment-plan/

3.5 Importing the System Security Plan

OSCAL is designed for traceability. Because of this, the assessment plan is designed to be linked to the system security plan. Rather than duplicating content from the SSP, the SAP is intended to reference the SSP content itself. **If a system security plan is available in OSCAL format, it must be used with the OSCAL-based security assessment plan.**

> **Unavailable or Inaccurate OSCAL-based SSP Content**
>
> *FedRAMP enables an assessor to use the OSCAL-based SSP, when no OSCAL-based SSP exists, or where the assessor finds it to be inaccurate. Where available, this guide explains how to capture relevant system information directly in the OSCAL SAP when needed.* ***Assessors must only use this capability to address unavailable or inaccurate content and must not duplicate accurate SSP content into the SAP.***

Use the `import-ssp` field to specify an existing OSCAL-based SSP. The `href` flag may include any valid uniform resource identifier (URI), including a relative path, absolute path, or URI fragment.

SAP Import Representation

```
    <import-ssp href="../ssp/FedRAMP-SSP-OSCAL-File.xml" />

- OR -

    <import-ssp href="#[uuid-value-of-resource]" />
```

XPath Queries

```
(SAP) URI to SSP:
  /*/import-ssp/@href
```

If the value is a URI fragment, such as `#96445439-6ce1-4e22-beae-aa72cfe173d0`, the value to the right of the hashtag (#) is the universally unique identifier (UUID) value of a resource in the SAP file's `back-matter`. Refer to the *Guide to OSCAL-based FedRAMP Content, Section 2.7, Citations and Attachments in OSCAL Files* for guidance on handling.

SAP Back Matter Representation

```
<back-matter>
    <resource uuid="96445439-6ce1-4e22-beae-aa72cfe173d0">
        <title>[System Name] [FIPS-199 Level] SSP</title>
        <prop name="type" value="system-security-plan"/>
        <!-- Specify the XML or JSON file location. Only one required. -->
        <rlink media-type="text/xml" href="./CSP_System_SSP.xml" />
        <rlink media-type="application/json" href="./CSP_System_SSP.json" />
        <!-- Do not embed a Base64-encoded SSP. -->
    </resource>
</back-matter>
```

Do Not Embed the SSP in the SAP

While OSCAL provides the ability to embed the SSP in the SAP, this approach does not align with FedRAMP's current delivery process and is discouraged.

XPath Queries

```
(SAP) Referenced OSCAL-based SSP

XML:
  /*/back-matter/resource[@uuid='96445439-6ce1-4e22-beae-aa72cfe173d0']
  /rlink[@media-type='application/xml']/@href

OR JSON:
  /*/back-matter/resource[@uuid='96445439-6ce1-4e22-beae-aa72cfe173d0']
  /rlink[@media-type='application/json']/@href
```

FedRAMP SSPs are delivered by the Cloud Service Provider (CSP), while FedRAMP SAPs are delivered by the assessor. For this reason, FedRAMP strongly encourages the use of relative paths from the OSCAL-based FedRAMP SAP to the OSCAL-based FedRAMP SSP.

Where the provided path is invalid, tool developers should ensure the tool prompts the user for the updated path to the OSCAL-based SSP.

3.5.1 When OSCAL-based SSP Information is Inaccurate

When an assessor encounters inaccurate information in an OSCAL-based SSP, they should encourage the CSP to fix it and use the corrected version of the SSP. The CSP is responsible for all SSP content. An assessor's tools must not change an SSP.

If an assessor must move forward with inaccurate SSP information, the SAP syntax allows for SSP information correction. Performing these corrections in the SAP instead of the SSP ensures the corrected content is clearly attributed to the assessor.

Tool designers should ensure their tools can cite the relevant OSCAL-based SSP information when possible and capture assessor-corrected SSP information in the SAP's `local-definitions` or `metadata` sections when necessary. The relevant sections of this guide describe how to represent inaccurate SSP information in the SAP when needed.

3.5.2 If No OSCAL-based SSP Exists (General)

The OSCAL-based SAP must always have an `import-ssp` field, even if no OSCAL-based SSP is available. To compensate for this, use a URI fragment that points to a `resource` in the `back-matter`. The resource must have a "type" property with the value of **`no-oscal-ssp`**

SAP Representation

```
<import-ssp href="#7c30125f-c056-4888-9f1a-7ed1b6a1b638" />

<back-matter>
    <resource uuid="ssp-information">
        <title>System's Full Name</title>
        <description>
            <p>Briefly describe the system. This will appear in the SAR.</p>
        </description>
        <prop name="type" value="no-oscal-ssp"/>
        <prop name="type" value="system-security-plan"/>
        <prop name="title-short"
              ns="https://fedramp.gov/ns/oscal" value="SFN"/>
        <prop name="authorization-date"
              ns="https://fedramp.gov/ns/oscal"
              value="2017-01-02T00:00:00Z"/>
        <prop name="system-id"
              ns="https://fedramp.gov/ns/oscal" value="FR00000000"/>
        <prop name="import-profile" ns="https://fedramp.gov/ns/oscal"
              value="#uuid-of-resource"/>
        <prop name="purpose" ns="https://fedramp.gov/ns/oscal"
              value="Briefly state the system's purpose, for the SAP and
                     SAR."/>
        <rlink href="/documents/CSP_System_SSP.docx"
               media-type="application/msword"/>
    </resource>
</back-matter>
```

XPath Queries

```
(SAP) Resource representing system details when no OSCAL-based SSP exists:
  /*/back-matter/resource/prop[@name='type'][@value='no-oscal-ssp']
```

The system's authorization date, purpose, and description have not historically been displayed in the SAP but must be present in the SAP for the SAR to reference.

Include the system name in the `title` field, and the system description in the `description` field. Add FedRAMP Extension properties to capture the system's short name as "title-short", FedRAMP-assigned system identifier as "system-id" and describe the system's purpose in "purpose".

Also include the "import-profile" extension and supply either a URI to the profile externally or a URI fragment with the UUID of the SAP resource containing the relevant profile details.

In addition to defining the system here, SAP tools must place other relevant SSP information in the SAP's `metadata` and `local-definitions` section as needed for the SAP to reference this information, essentially treating all relevant SSP content as "missing" from an OSCAL perspective.

The relevant sections of this guide describe how to represent missing SSP in formation in the SAP when needed.

3.6 Resolution Resource Prop

FedRAMP will be implementing a separate set of automated SAP validation rules for the rev 5 OSCAL templates. To ensure FedRAMP initiates the appropriate validation rules when processing OSCAL SAPs, SAP authors should add a new `prop` called `"resolution-resource"` in the `metadata` section and include an associated back-matter `resource` as shown below:

SSP Resolution Resource

```
<assessment-plan>
   <metadata>
      <title>FedRAMP Security Assessment Plan (SAP)</title>
      <!-- cut -->
      <version>fedramp2.0.0-oscal1.0.4</version>
      <oscal-version>1.0.4</oscal-version>
      <revisions>
         <revision>
            <!-- cut -->
      </revisions>
      <!-- New rev 5 prop -->
      <prop ns="https://fedramp.gov/ns/oscal" name="resolution-resource"
         value="ace2963d-ecb4-4be5-bdd0-1f6fd7610f41" />
   </metadata>
   <!-- cut -->
  <back-matter>
<resource uuid="ace2963d-ecb4-4be5-bdd0-1f6fd7610f41">
         <title>Resolution Resource</title>
         <prop name="dataset" class="collection" value="Special 
Publication"/>
         <prop name="dataset" class="name" value="800-53"/>
         <prop name="dataset" class="version" value="5.0.2"/>
         <prop name="dataset" class="organization" value="gov.nist.csrc"/>
         <remarks>
            <p>This "resolution resource" is used by FedRAMP as a local, 
authoritative indicator of what version SAP (rev 4 or rev 5) this OSCAL 
document is for.</p>
         </remarks>
      </resource>

   </back-matter>
</ assessment-results>
```

XPath Queries

```
(SAR) UUID of “resolution-resource”:
  /*/metadata/prop[@name=”resolution-resource”]/@value

(SAR)Target baseline version:
  /*/back-matter/resource[@uuid=”uuid-of-resolution-
  resource”]/prop[@name=”dataset” and @class=”version”]/@value
```

If the `“resolution-resource”` prop is not specified in the `metadata` section of the SAP, FedRAMP will assume the SAP should be validated using the rev 5 validation rules. If the `“resolution-resource”` prop is present, FedRAMP will use the validation rules that correspond with the version specified in the back-matter resource.

4 SAP Template to OSCAL Mapping

For SAP-specific content, each page of the SAP is represented in this section, along with OSCAL code snippets for representing the information in OSCAL syntax. There is also XPath syntax for querying the code in an OSCAL-based FedRAMP SAP represented in XML format.

Content that is common across OSCAL file types is described in the *Guide to OSCAL-based FedRAMP Content*. This includes the following:

TOPIC	LOCATION
Title Page	*Guide to OSCAL-based FedRAMP Content, Section 4.1*
Prepared By/For	*Guide to OSCAL-based FedRAMP Content, Section 4.2 - 4.4*
Record of Template reChanges	Not Applicable. Instead follow *Guide to OSCAL-based FedRAMP Content, Section 2.3.2, OSCAL Syntax Version*
Revision History	*Guide to OSCAL-based FedRAMP Content, Section 4.5*
How to Contact Us	*Guide to OSCAL-based FedRAMP Content, Section 4.6*
Document Approvers	*Guide to OSCAL-based FedRAMP Content, Section 4.7*
Acronyms and Glossary	*Guide to OSCAL-based FedRAMP Content, Section 4.8*
Laws, Regulations, Standards and Guidance	*Guide to OSCAL-based FedRAMP Content, Section 4.9*
Attachments and Citations	*Guide to OSCAL-based FedRAMP Content, Section 4.10*

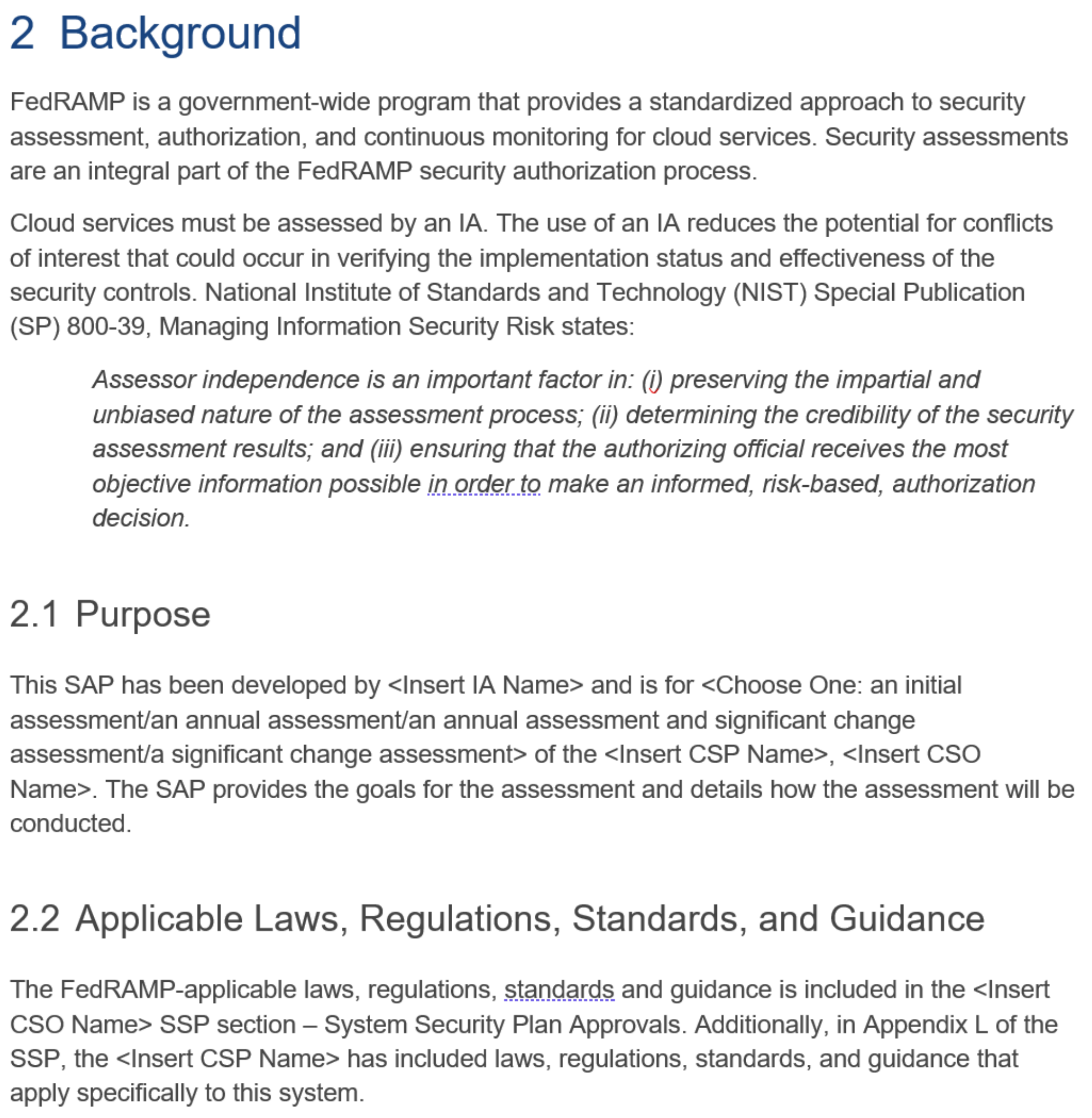
It is not necessary to represent the following sections of the SAR template in OSCAL; however, tools should present users with this content where it is appropriate:

- Any blue-text instructions found in the SAP template where the instructions are related to the content itself.
- Table of Contents.
- Introductory and instructive content in each section.

The Annual SAP was used, which includes all information typically found in the Initial SAP, plus a scope section that is unique to annual assessments. OSCAL always requires a scope. For initial assessments, the scope is all controls. For annual assessments, it is the controls required by FedRAMP.

NOTE: The FedRAMP SAP template screenshots in the sections that follow vary slightly from the most current version of the FedRAMP rev 5 SAP template.

The following pages are intended to be printed landscape on tabloid (11" x 17") paper.



2 Background

FedRAMP is a government-wide program that provides a standardized approach to security assessment, authorization, and continuous monitoring for cloud services. Security assessments are an integral part of the FedRAMP security authorization process.

Cloud services must be assessed by an IA. The use of an IA reduces the potential for conflicts of interest that could occur in verifying the implementation status and effectiveness of the security controls. National Institute of Standards and Technology (NIST) Special Publication (SP) 800-39, Managing Information Security Risk states:

> *Assessor independence is an important factor in: (i) preserving the impartial and unbiased nature of the assessment process; (ii) determining the credibility of the security assessment results; and (iii) ensuring that the authorizing official receives the most objective information possible in order to make an informed, risk-based, authorization decision.*

2.1 Purpose

This SAP has been developed by <Insert IA Name> and is for <Choose One: an initial assessment/an annual assessment/an annual assessment and significant change assessment/a significant change assessment> of the <Insert CSP Name>, <Insert CSO Name>. The SAP provides the goals for the assessment and details how the assessment will be conducted.

2.2 Applicable Laws, Regulations, Standards, and Guidance

The FedRAMP-applicable laws, regulations, standards and guidance is included in the <Insert CSO Name> SSP section – System Security Plan Approvals. Additionally, in Appendix L of the SSP, the <Insert CSP Name> has included laws, regulations, standards, and guidance that apply specifically to this system.

Background Section Content

Capturing the SAP *background*, *purpose*, and *applicable laws* prose in OSCAL is not required by FedRAMP but may be useful for scenarios where rendering the content in human-readable format is desired (e.g., converting the OSCAL SAP to a formatted PDF or Word document). If the content is not captured within the OSCAL `terms-and-conditions` assembly, conversion tools can query the OSCAL SAP (and associated SSP) for specific data items such as the IA name, the CSP name, the CSO name, etc.

4.1 Background

The *Background*, *Purpose*, and *Applicable Laws* sections of the FedRAMP SAP template contain references to the CSP name, the CSO name, and the independent assessor (IA) name. The information in these sections may be represented as a `part` assembly within the `terms-and-conditions` element of an OSCAL SSP. This approach is optional as the specific data items can simply be queried from an OSCAL SAP and its associated documents.

Representation

```
<!-- cut -->

   <terms-and-conditions>
      <!-- Section 2 Background -->
      <part ns="https://fedramp.gov/ns/oscal" name="background">
         <title>Background</title>
         <p>Insert text from FedRAMP template</p>
         <p> Insert text from FedRAMP template </p>
         <part ns="https://fedramp.gov/ns/oscal" name="nist-sp800-39">
            <p> Insert text from FedRAMP template</p>
         </part>
         <!-- Section 2.1 -->
         <part ns="https://fedramp.gov/ns/oscal" name="purpose">
            <title>Purpose</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="001"/>
            <p>This SAP has been developed by [IA Name] and is for [an initial
assessment/an annual assessment/an annual assessment and significant change assessment/a
significant change assessment] of the [CSP Name], [CSO Name]. The SAP provides the goals
for the assessment and details how the assessment will be conducted.</p>
         </part>
         <!-- Section 2.2 -->
         <part ns="https://fedramp.gov/ns/oscal" name="laws-regulations" >
            <title>Applicable Laws, Regulations, Standards and Guidance</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="002"/>
            <p>The FedRAMP-applicable laws, regulations, standards and guidance is
included in the [CSO Name] SSP section - System Security Plan Approvals. Additionally,
in Appendix L of the SSP, the [CSP Name] has included laws, regulations, standards, and
guidance that apply specifically to this system.</p>
         </part>
      </part>
      <!-- cut -->
   </terms-and-conditions>
```

XPath Queries

```
(SAP) IA Name:
  /assessment-plan/metadata/party[@uuid="uuid-of-ia"]/name

(SAP) Initial assessment, annual assessment, or significant change?
  /assessment-plan/metadata/prop[@ns="https://fedramp.gov/ns/oscal" and
  @name="assessment-type"]/@value
```

Instruction:

If the CSP is leveraging another cloud service, use the following narrative and table. Otherwise, delete the narrative and table.

Delete this instructional text from your final version of this document.

<Insert CSO Name> leverages the FedRAMP Authorized CSOs listed in Table 3-2. <Insert CSP Name>, as a customer of these CSOs, must meet customer requirements documented by the leveraged CSOs in the customer responsibility matrix (CRM). Therefore, <Insert IA Name> will validate to the best of their ability that <Insert CSO Name> is in compliance with customer requirements documented in the CRMs of the leveraged CSOs.

Table 3-2 Leveraged Systems CSP/CSO

FedRAMP Package ID	<Insert CSP Name>	<Insert CSO Name>

See *Section 4.1, Background* for information on how to capture SAP scope information within the OSCAL `terms-and-conditions` assembly and how to query the OSCAL SAP (and associated SSP) for specific data items such as the IA name, the CSP name, the CSO name, etc.

```
(SAP) Are there no/one/many significant changes in SAP scope?
  /assessment-plan/metadata/prop[@ns="https://fedramp.gov/ns/oscal" and
  @name="significant-changes-scope"]/@value
(SAP) CSP Name:
  /assessment-plan/metadata/party[@uuid="uuid-of-csp"]/name
(SSP) CSO Name:
  /system-security-plan/system-characteristics/system-name
```

4.2 Scope

This information should come entirely from the imported SSP. If the OSCAL-based SSP exists and is accurate, the tool should query that file for this information as follows:

SSP XPath Queries

```
Table 2-1
(SSP) Unique Identifier:
  /*/system-characteristics/system-id[@identifier-type='https://fedramp.gov']
(SSP) Information System Name:
  /*/system-characteristics/system-name
(SSP) Information System Abbreviation:
  /*/system-characteristics/system-name-short
```

If no OSCAL-based SSP exists, as described in *Section 3.5.2, If No OSCAL-based SSP Exists (General)*, the resource with the `no-oscal-ssp` type must designate the system's identifier, name, and abbreviation.

NOTE:

The system's authorization date, purpose, and description have not historically been displayed in the SAP but must be present when the SAR references this content.

3.1 Location of components

The physical locations of all the different components that will be tested are described in Table 3-3.

Table 3-3 Location of Components

Data Center Site Name	Address	Description of Components

Information in the SSP is cited from the SAP using its ID. See *Section 3.5, Importing the System Security Plan* for more

The `description` and `remarks` fields are *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.2.1 Location of Components

The SAP reference location information in the SSP using its ID and must explicitly cite each location within the scope of the assessment. While `all` is valid OSCAL syntax, FedRAMP requires locations to be explicitly cited, so that the assessor can add their own description of the location. Also, the SSP will likely also contain locations that are not data centers.

Representation

```
<assessment-subject type="location">
    <description>
        <p>A description of the locations.</p>
    </description>
    <include-subject subject-uuid="uuid-of-location-in-SSP-metadata" type="token">
        <remarks>
            <p>Briefly describe the components at this location.</p>
        </remarks>
    </include-subject>
    <include-subject subject-uuid="uuid-of-location-in-SAP-metadata" type="token">
        <remarks>
            <p>Briefly describe the components at this location.</p>
        </remarks>
    </include-subject>
</assessment-subject>
```

XPath Queries

```
(SSP) List the Data Center UUIDs in the SSP (Primary and Alternate):
  /*/metadata/location[prop[@name='type'][@value='data-center']]/@uuid

(SSP) List the Primary Data Center UUIDs in the SSP:
  /*/metadata/location[prop[@name='type'][@value='data-center'][@class='primary']]/@uuid

NOTE: For just alternate data centers, replace 'primary' with 'alternate'.

(SAP) Location UUID (First Location cited in SAP):
  /*/assessment-subject[@type='location']/include-subject[1]/@subject-uuid

NOTE: Replace "[1]" with "[2]", "[3]", etc.

(SSP) Data Center Site Name (Lookup in SSP, using ID cited in SAP):
  /*/metadata/location[@id='location-2']/prop[@name='title']
  [@ns='https://fedramp.gov/ns/oscal']

NOTE: Replace 'location-2' with the SSP location as cited in the SAP.

(SSP or SAP) Address:
  /*/metadata/location[@uuid='uuid-value-from-SAP']/address/addr-line

NOTE: Replace addr-line with city, state, and postal-code as needed.
  There may be more than one addr-line.

NOTE: Replace 'location-2' with the SSP location as cited in the SAP.


(SSP) CSP's Description of Location (from SSP):
  /*/metadata/location[@uuid='uuid-value-for-location-2']/remarks
```

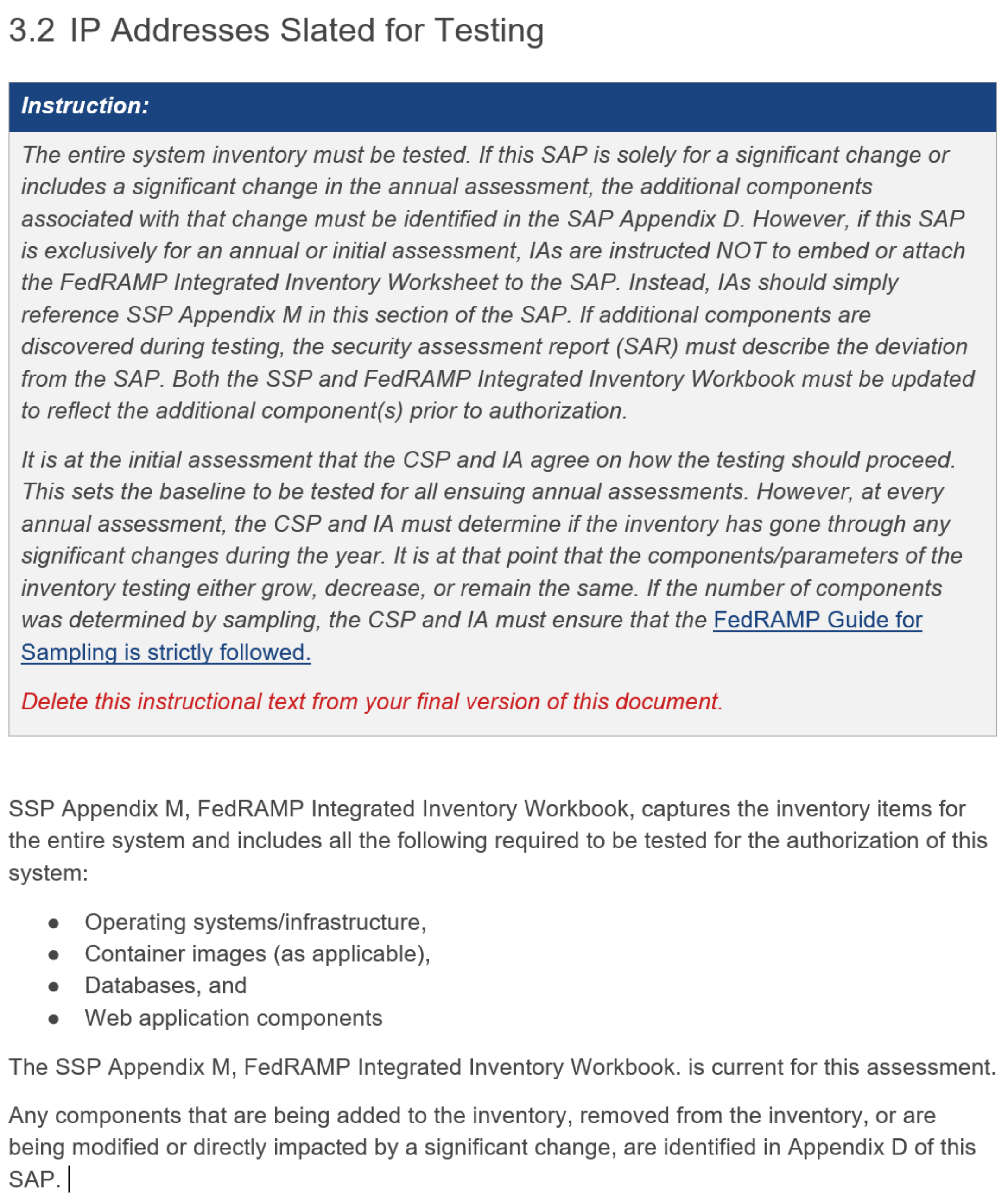
See Previous Section for
"Location of Components"

Information in the SSP is cited from the SAP using its UUID. See *Section 3.5, Importing the System Security Plan* for more information.

```
(SAP) Assessor's Description of Components at the first location:
  /*/assessment-subject[@type='location']/include-subject[1]/remarks/node()
NOTE: Replace "[1]" with "[2]", "[3]", etc.
```

If no OSCAL-based SSP exists, or the location of components is not accurately reflected in the SSP, this information may be added to the SAP's `metadata` section using the same syntax as the SSP. The `include-subject` citations are still required as described above; however, the IDs point to the SAP's location data instead of the SSP's.

The same queries work as presented above; however, the queries are used in the SAP instead of the SSP.



3.2 IP Addresses Slated for Testing

Instruction:

The entire system inventory must be tested. If this SAP is solely for a significant change or includes a significant change in the annual assessment, the additional components associated with that change must be identified in the SAP Appendix D. However, if this SAP is exclusively for an annual or initial assessment, IAs are instructed NOT to embed or attach the FedRAMP Integrated Inventory Worksheet to the SAP. Instead, IAs should simply reference SSP Appendix M in this section of the SAP. If additional components are discovered during testing, the security assessment report (SAR) must describe the deviation from the SAP. Both the SSP and FedRAMP Integrated Inventory Workbook must be updated to reflect the additional component(s) prior to authorization.

It is at the initial assessment that the CSP and IA agree on how the testing should proceed. This sets the baseline to be tested for all ensuing annual assessments. However, at every annual assessment, the CSP and IA must determine if the inventory has gone through any significant changes during the year. It is at that point that the components/parameters of the inventory testing either grow, decrease, or remain the same. If the number of components was determined by sampling, the CSP and IA must ensure that the FedRAMP Guide for Sampling is strictly followed.

Delete this instructional text from your final version of this document.

SSP Appendix M, FedRAMP Integrated Inventory Workbook, captures the inventory items for the entire system and includes all the following required to be tested for the authorization of this system:

- Operating systems/infrastructure,
- Container images (as applicable),
- Databases, and
- Web application components

The SSP Appendix M, FedRAMP Integrated Inventory Workbook. is current for this assessment.

Any components that are being added to the inventory, removed from the inventory, or are being modified or directly impacted by a significant change, are identified in Appendix D of this SAP.

FedRAMP Component vs. OSCAL Component

FedRAMP uses the term "component" to generally mean any component of a system, especially its system inventory. OSCAL distinctly separates "components" and "inventory-items" while maintaining a relationship between the two. From FedRAMP's perspective, an inventory-item is still a component. This distinction becomes important when representing FedRAMP "components" in OSCAL.

4.2.2 IP Addresses Slated for Testing

The SAP references SSP content for this information. Each subnet should be represented in the SSP as a `component` with `type='subnet'`. If the SSP does not enumerate subnets in this way, the SAP tool should allow the assessor to add them to the SAP's `local-definitions` as components.

Beyond subnets, this section is an enumeration of the SSP's `inventory-item` assemblies, which always contain the hostname and IP address of the item. Other details, such as the software and version information, may be found in the inventory item itself or the SSP inventory item may be linked to an SSP component containing those details, depending on whether the SSP is using the legacy (flat) approach or the preferred component approach.

If the assessor needs to add missing component or inventory-item entries, or if the assessor needs to correct this information, the SAP tool must add this assessor-provided information to the SAP's local-definitions.

See the *Guide to OSCAL-based FedRAMP System Security Plans* to learn more about legacy (flat-file) and component-based inventory approaches. Use a combination of `include-subject` and `exclude-subject` assemblies to specify the SSP IDs of all in-scope components and inventory-items. Excluding items is typically used in association with the rules of engagement.

If an inventory-item is linked to a component in the SSP, the component is automatically within scope as this is often necessary to get the software and version information. Tools should honor this relationship and consider linked components to be implicitly in-scope even if the component was not explicitly cited in the SAP.

Representation

```
<assessment-subject type="component">
    <description><p>A description of the included component.</p></description>
    <include-all />
    <exclude-subject subject-uuid="uuid-of-SSP-component-to-exclude" type="token" />
</assessment-subject>

<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-all />
    <exclude-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
    <exclude-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
</assessment-subject>
<!-- OR -->
<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-include"
                     type="token" />
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-include"
                     type="token" />
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
</assessment-subject>
```

The [1] indicates the first `uuid-ref` within any `include-subject` of type "inventory-item".

3.2 IP Addresses Slated for Testing

Instruction:

The entire system inventory must be tested. If this SAP is solely for a significant change or includes a significant change in the annual assessment, the additional components associated with that change must be identified in the SAP Appendix D. However, if this SAP is exclusively for an annual or initial assessment, IAs are instructed NOT to embed or attach the FedRAMP Integrated Inventory Worksheet to the SAP. Instead, IAs should simply reference SSP Appendix M in this section of the SAP. If additional components are discovered during testing, the security assessment report (SAR) must describe the deviation from the SAP. Both the SSP and FedRAMP Integrated Inventory Workbook must be updated to reflect the additional component(s) prior to authorization.

It is at the initial assessment that the CSP and IA agree on how the testing should proceed. This sets the baseline to be tested for all ensuing annual assessments. However, at every annual assessment, the CSP and IA must determine if the inventory has gone through any significant changes during the year. It is at that point that the components/parameters of the inventory testing either grow, decrease, or remain the same. If the number of components was determined by sampling, the CSP and IA must ensure that the FedRAMP Guide for Sampling is strictly followed.

Delete this instructional text from your final version of this document.

SSP Appendix M, FedRAMP Integrated Inventory Workbook, captures the inventory items for the entire system and includes all the following required to be tested for the authorization of this system:

- Operating systems/infrastructure,
- Container images (as applicable),
- Databases, and
- Web application components

The SSP Appendix M, FedRAMP Integrated Inventory Workbook. is current for this assessment.

Any components that are being added to the inventory, removed from the inventory, or are being modified or directly impacted by a significant change, are identified in Appendix D of this SAP.

XPath Queries

```
(SAP) Should all inventory-items be included? (true/false):
  boolean(/*/assessment-subject[@type='inventory-item']/include-all)

NOTE: This means all inventory-items in the SSP's system-implementation as well as all
  inventory-items in the SAP's local definitions

(SAP) Get the first inventory-item UUID from the SAP:
  /*/assessment-subject[@type='inventory-item']/include-subject[1]/@subject-uuid

(SSP) Get Host Name from inventory-item in the SSP:
  /*/system-implementation/system-inventory/
  inventory-item[@uuid='uuid-value-from-above']/prop[@name='fqdn']
```

3.2 IP Addresses Slated for Testing

Instruction:

The entire system inventory must be tested. If this SAP is solely for a significant change or includes a significant change in the annual assessment, the additional components associated with that change must be identified in the SAP Appendix D. However, if this SAP is exclusively for an annual or initial assessment, IAs are instructed NOT to embed or attach the FedRAMP Integrated Inventory Worksheet to the SAP. Instead, IAs should simply reference SSP Appendix M in this section of the SAP. If additional components are discovered during testing, the security assessment report (SAR) must describe the deviation from the SAP. Both the SSP and FedRAMP Integrated Inventory Workbook must be updated to reflect the additional component(s) prior to authorization.

It is at the initial assessment that the CSP and IA agree on how the testing should proceed. This sets the baseline to be tested for all ensuing annual assessments. However, at every annual assessment, the CSP and IA must determine if the inventory has gone through any significant changes during the year. It is at that point that the components/parameters of the inventory testing either grow, decrease, or remain the same. If the number of components was determined by sampling, the CSP and IA must ensure that the FedRAMP Guide for Sampling is strictly followed.

Delete this instructional text from your final version of this document.

SSP Appendix M, FedRAMP Integrated Inventory Workbook, captures the inventory items for the entire system and includes all the following required to be tested for the authorization of this system:

- Operating systems/infrastructure,
- Container images (as applicable),
- Databases, and
- Web application components

The SSP Appendix M, FedRAMP Integrated Inventory Workbook. is current for this assessment.

Any components that are being added to the inventory, removed from the inventory, or are being modified or directly impacted by a significant change, are identified in Appendix D of this SAP.

4.2.2.1 If No OSCAL-based SSP Exists or Has Inaccurate Information (IP Addresses)

If no OSCAL-based SSP exists, or the inventory information is not accurately reflected in the SSP, this information may be added to the SAP's `local-definition` section as described below. The `include-subject` citations are still required as described above; however, the UUIDs point to the SAP's local definitions instead of the SSP.

Representation

```
<local-definitions>
    <inventory-item uuid="uuid-value">
        <description>
            <p>A Windows laptop, not defined in the SSP inventory.</p>
        </description>
        <prop name="ipv4-address" value="10.1.1.99"/>
        <prop name="virtual" value="no"/>
        <prop name="public" value="no"/>
        <prop name="fqdn" value="dns.name"/>
        <prop name="mac-address" value="00:00:00:00:00:00"/>
        <prop name="software-name" value="Windows 10"/>
        <prop name="version" value="V 0.0.0"/>
        <prop name="asset-type" value="os"/>
        <!-- Use any needed prop allowed in an SSP inventory item  -->
    </inventory-item>

    <inventory-item uuid="uuid-value" asset-id="none">
        <description><p>A subnet not defined in the SSP inventory.</p></description>
        <prop name="ipv4-subnet">10.20.30.0/24</prop>
        <!-- Use any needed prop allowed in an SSP inventory item  -->
    </inventory-item>
</local-definitions>

<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-subject subject-uuid="uuid-of-SAP-inventory-item-to-include"
                     type="token" />
    <exclude-subject subject-uuid="uuid-of-SAP-inventory-item-to-include"
                     type="token" />
</assessment-subject>
```

XPath Queries

```
(SAP) Get the included ID the same way:
  /*/assessment-subject[@type='inventory-item']/include-subject[2]/@subject-uuid

(SAP) Get Subnet from inventory-item in the SAP:
  /*/local-definitions/inventory-item[@uuid='value-from-above']/prop[@name='ipv4-
  subnet']/@value
```

3.2 IP Addresses Slated for Testing

Instruction:

The entire system inventory must be tested. If this SAP is solely for a significant change or includes a significant change in the annual assessment, the additional components associated with that change must be identified in the SAP Appendix D. However, if this SAP is exclusively for an annual or initial assessment, IAs are instructed NOT to embed or attach the FedRAMP Integrated Inventory Worksheet to the SAP. Instead, IAs should simply reference SSP Appendix M in this section of the SAP. If additional components are discovered during testing, the security assessment report (SAR) must describe the deviation from the SAP. Both the SSP and FedRAMP Integrated Inventory Workbook must be updated to reflect the additional component(s) prior to authorization.

It is at the initial assessment that the CSP and IA agree on how the testing should proceed. This sets the baseline to be tested for all ensuing annual assessments. However, at every annual assessment, the CSP and IA must determine if the inventory has gone through any significant changes during the year. It is at that point that the components/parameters of the inventory testing either grow, decrease, or remain the same. If the number of components was determined by sampling, the CSP and IA must ensure that the FedRAMP Guide for Sampling is strictly followed.

Delete this instructional text from your final version of this document.

SSP Appendix M, FedRAMP Integrated Inventory Workbook, captures the inventory items for the entire system and includes all the following required to be tested for the authorization of this system:

- Operating systems/infrastructure,
- Container images (as applicable),
- Databases, and
- Web application components

The SSP Appendix M, FedRAMP Integrated Inventory Workbook. is current for this assessment.

Any components that are being added to the inventory, removed from the inventory, or are being modified or directly impacted by a significant change, are identified in Appendix D of this SAP.

The `description` field is *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content, Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.2.3 SAP Web Applications Slated for Testing

The SSP inventory data should already indicate which assets have a web interface, with the following FedRAMP extension:

```
<prop name="scan-type" ns="https://fedramp.gov/ns/oscal" value="web"/>
```

This typically appears in the `inventory-item` itself with the legacy approach and appears in a `component` associated with the `inventory-item` if the SSP is using the component-based approach. See the *Guide to OSCAL-based System Security Plans (SSP)* for details on the flat-file and component-based approaches.

FedRAMP expects the assessor to review and validate the list of identified web applications, both initially in the SAP and as a result of the discovery scans once the assessment begins. SAP tools should facilitate this review and adjustment of inventory data as needed for the assessor to properly identify all web applications for testing.

For every web interface to be tested, whether pre-identified in the SSP inventory or identified by the assessor, there must be a `task` entry. If the inventory-item already contains the `login-url`, the tool should duplicate it here. If not, the tool should enable the assessor to add it here. A SAP tool should also enable the assessor to add a `login-id` for test users here. Both use FedRAMP extensions.

Representation

```
<local-definitions>
    <activity uuid="uuid-of-web-application-activity">
        <title>Web Application Test #1</title>
        <description><p>Describe this web application test.</p></description>
        <prop name="type" ns="https://fedramp.gov/ns/oscal" value="web-application"/>
    </activity>
</local-definitions>
<!-- cut: terms-and-conditions, reviewed-controls, assessment-subject -->
<task uuid="task-uuid-value">
    <title>Web Application Tests</title>
    <task uuid="uuid-value">
        <title>Web Application Test #1</title>
        <prop name="type" ns="https://fedramp.gov/ns/oscal" value="web-application"/>
        <prop name="login-url" ns="https://fedramp.gov/ns/oscal"
              value="https://service.offering.com/login"/>
        <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-user"/>
        <associated-activity activity-uuid="uuid-of-web-application-activity">
            <subject type="inventory-item">
                <include-subject subject-uuid="uuid-of-SSP-inventory-item"
                                 type="inventory-item" />
            </subject>
        </associated-activity>
    </task>
</task>
```

3.2 IP Addresses Slated for Testing

Instruction:

The entire system inventory must be tested. If this SAP is solely for a significant change or includes a significant change in the annual assessment, the additional components associated with that change must be identified in the SAP Appendix D. However, if this SAP is exclusively for an annual or initial assessment, IAs are instructed NOT to embed or attach the FedRAMP Integrated Inventory Worksheet to the SAP. Instead, IAs should simply reference SSP Appendix M in this section of the SAP. If additional components are discovered during testing, the security assessment report (SAR) must describe the deviation from the SAP. Both the SSP and FedRAMP Integrated Inventory Workbook must be updated to reflect the additional component(s) prior to authorization.

It is at the initial assessment that the CSP and IA agree on how the testing should proceed. This sets the baseline to be tested for all ensuing annual assessments. However, at every annual assessment, the CSP and IA must determine if the inventory has gone through any significant changes during the year. It is at that point that the components/parameters of the inventory testing either grow, decrease, or remain the same. If the number of components was determined by sampling, the CSP and IA must ensure that the FedRAMP Guide for Sampling is strictly followed.

Delete this instructional text from your final version of this document.

SSP Appendix M, FedRAMP Integrated Inventory Workbook, captures the inventory items for the entire system and includes all the following required to be tested for the authorization of this system:

- Operating systems/infrastructure,
- Container images (as applicable),
- Databases, and
- Web application components

The SSP Appendix M, FedRAMP Integrated Inventory Workbook. is current for this assessment.

Any components that are being added to the inventory, removed from the inventory, or are being modified or directly impacted by a significant change, are identified in Appendix D of this SAP.

XPath Queries

```
(SAP) Login URL:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[1]/prop[@name='login-url'][@ns="https://fedramp.gov/ns/oscal"]

(SAP) Login ID:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[1]/prop[@name='login-id'][@ns="https://fedramp.gov/ns/oscal"]

(SAP) Inventory-ID of host:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[2]/ associated-activity/subject[@type='inventory-item']/include-
  subject/@subject-uuid

NOTE: Replace "[2]" with "[2]", "[3]", etc.

REMEMBER: The inventory-item could be in the SSP's system-implementation or the SAP's
  local-definitions.
```

4.2.4 SAP Databases Slated for Testing

The SSP inventory data should already indicate which assets are a database, with the following FedRAMP extension:

```
<prop name="scan-type" ns="https://fedramp.gov/ns/oscal" value="database"/>
```

This typically appears in the `inventory-item` itself with the legacy (flat-file) approach and appears in a `component` associated with the `inventory-item` if the SSP is using the component-based approach. See the *Guide to OSCAL-based System Security Plans (SSP)* for details on the flat-file and component-based approaches.

FedRAMP expects the assessor to review and validate the list of identified databases, both initially in the SAP and as a result of discovery scans once the assessment begins. SAP tools should facilitate this review and adjustment of inventory data as needed for the assessor to properly identify all databases for testing.

XPath Queries

```
(SSP) Host name of first database in SSP(flat file approach):
  (/*/system-implementation/system-inventory/inventory-item/prop[@name='scan-
  type'][string()='database'])[1]/../prop[@name='fqdn']

(SSP) Host name of the first database in SSP (component approach) [xPath 2.0+ only]:
  (let $key:=/*/system-implementation/component[prop [@name='scan-type']
  [@ns='https://fedramp.gov/ns/oscal']='database']/@id return /*/system-
  implementation/system-inventory/inventory-item [implemented-component/@component-
  id=$key]/prop[@name='fqdn'])[1]
```

4.2.4.1 If No OSCAL-based SSP Exists or Has Inaccurate Information (Database)

If no OSCAL-based SSP exists, or an item is missing completely from the SSP inventory, it should have already been added as described in *Section 4.2.2.1, If No OSCAL-based SSP Exists or Has Inaccurate Information (IP* Addresses).

If a pre-existing SSP inventory item fails to properly identify a database, the tool should enable the assessor to add this designation with an entry in the SAP `local-definitions`, except the value `database` should be used instead of `web` for the scan-type.

3.3 Role Testing Exclusions

Instruction:
If any roles were excluded from testing, use the following table to document the role type and reason for exclusion. If no roles were excluded, leave the table blank. *Delete this instructional text from your final version of this document.*

Table 3-4 Exclusions for Role Testing

Role Type	Reason for Exclusion

3.4 Role Testing for Significant Change Requests

Instruction:
If this SAP is for a significant change request (SCR), include the following; otherwise, remove it. *Delete this instructional text from your final version of this document.*

Additional roles that are being introduced as part of significant changes will be tested and are noted in Appendix D. Role testing will be performed to test the authorization restrictions for each role. <Insert IA Name> will access the system while logged in as different user types and attempt to perform restricted functions for that user.

4.2.5 Roles Testing Inclusions and Exclusion

Historically, FedRAMP assessors often identified generalized roles for testing, such as "internal", "external", and "privileged" rather than citing the specific roles enumerated in the SSP. This is in response to a FedRAMP requirement to test roles from each perspective. Assessors must ensure all roles are included for testing and identify roles excluded from testing. When processing an OSCAL SAP, SAP tools should present assessors with the roles from the associated (`import-ssp`) SSP so the assessor can select specific roles for testing. SAP tools should allow the assessor to easily identify roles that are excluded. Section 6.2 of the *Guide to OSCAL-based System Security Plans (SSP)* describes personnel roles and privileges with examples illustrating how to identify them in an OSCAL SSP. If the "roles" slated for testing exist in the SSP, the SSP roles are referenced from the SAP using their SSP IDs as defined in the SSP `user` assemblies in the `system-implementation` section of the OSCAL-based SSP file. **Note that in this case, the SAP role must actually map to the `uuid` of the `user` assembly in the SSP.**

Assessors should ensure the selection of at least one SSP-defined role from each of the common generalized role categories (“internal”, “external”, and “privileged”). If the assessor elects to reference more generic roles, the SAP tool should enable the assessor to create these generic roles locally in the SAP `local-definitions` assembly.

Representation

```
<local-definitions>
    <!—add user assembly for each role to be assessed →
    <user uuid=”uuid-value”>
        <title>Assessor Specified Role</title>
        <prop name=”sensitivity” ns=”https://fedramp.gov/ns/oscal” value=”limited” />
        <prop name=”type” value=”external”/>
        <prop name=”privilege-level” value=”no-logical-access” />
        <role-id>id-for-assessor-specified-role</role-id>
        <authorized-privilege>
            <title>Full administrative access (root)</title>
            <function-performed>Add/remove users and hardware</function-performed>
            <function-performed>install and configure software</function-performed>
            <function-performed>OS updates, patches and hotfixes</function-performed>
            <function-performed>perform backups</function-performed>
        </authorized-privilege>
    </user>
</local-definitions>
```

For every role to be tested, whether pre-identified in the SSP or identified by the assessor, there must be an `assessment-subject` entry, and at least one corresponding `task`. A SAP tool should enable the assessor to add a test user ID here via FedRAMP extension properties.

Representation

```
<assessment-plan>
    <!-- cut metadata -->
    <!-- cut import-ssp, local-definitions, terms-and-conditions, reviewed-controls -->
    <!-- set type to 'user' -->
    <assessment-subject type="user">
        <description>
            <p>A description of the included roles.</p>
            <p>A description of an excluded role.</p>
        </description>
        <!-- uuid from SSP or SAP lcocal-definitions -->
        <include-subject subject-uuid="user-uuid-from-SSP" type="token" />
        <exclude-subject subject-uuid="user-uuid-from-SSP" type="token" />
    </assessment-subject>
    <!-- cut assessment-assets -->
    <task uuid="task-uuid" type="action">
        <title>Role-Based Tests</title>
        <task uuid="test1-uuid" type="action">
            <title>Role Based Test #1</title>
            <prop name="test-type"
                      ns="https://fedramp.gov/ns/oscal" value="role-based"/>
            <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-user"/>
            <!-- uuid from SSP or SAP lcocal-definitions -->
            <prop name="user-uuid"
                      ns="https://fedramp.gov/ns/oscal"
                  value="user-uuid-value"/>
            <associated-activity activity-uuid="uuid-of-role-testing-activity" />
        </task>
        <task uuid="test2-uuid" type="action">
            <title>Role Based Test #2</title>
            <prop name="test-type" ns="https://fedramp.gov/ns/oscal"
                  value="role-based"/>
            <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-admin"/>
            <!-- uuid from SSP or SAP lcocal-definitions -->
            <prop name="user-uuid" ns="https://fedramp.gov/ns/oscal"
                  value="user-uuid-value"/>
            <associated-activity activity-uuid="uuid-of-role-testing-activity" />
        </task>
    </task>
    <!-- cut back-matter -->
</assessment-plan>
```

.

4 Assumptions

Instruction:

The assumptions listed are default assumptions. An IA must edit these assumptions as necessary for each unique engagement. While some systems conform to a methodology, the methodology offered here is only an example and can be used for the basis of the CSO assessment; however, the JAB and FedRAMP PMO expect each CSO assessment to be unique and may have a much-expanded testing methodology applied.

Delete this instructional text from your final version of this document.

The following assumptions were agreed upon between <Insert CSP Name> and <Insert IA Name> when developing this SAP:

- This SAP is based on <Insert CSO Name> SSP <Insert Version X.X>, dated <Insert MM/DD/YYYY>, in its entirety. This includes all SSP appendices. The <Insert CSP Name> is responsible for providing <Insert IA Name> the most current SSP.
- Scans will be provided in both machine readable and human readable format.
- <Insert CSO Name> resources, including documentation and individuals with knowledge of the <Insert CSO Name> systems and infrastructure and their contact information, will be available to <Insert IA Name> staff during the time necessary to complete assessments.
- The <Insert CSP Name> will provide login account information / credentials necessary for <Insert IA Name> to use its testing devices to perform authenticated scans of all devices and applications.
- The <Insert CSP Name> will permit <Insert IA Name> to connect its testing laptops to the <Insert CSP Name> networks defined within the scope of this assessment.
- The <Insert CSP Name> will permit communication from <Insert IA Name> testing appliances to an internet hosted vulnerability management service to permit the analysis of vulnerability data, as applicable.
- Security controls that have been identified as “Not Applicable” (NA) in the SSP will be validated by <Insert IA Name> as “Not Applicable”, and further testing will not be performed on these security controls during the assessment. This process is completed for all assessments, including annual assessments. For this assessment, the following controls identified as NA controls will be validated by <Insert IA Name>: **<List all NA controls that will be validated by the IA for this assessment>.**

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content, Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.3 SAP Assumptions

SAP Assumptions use syntax similar to OSCAL control catalog statements. They have a sort-id, which a tool can use to ensure the intended sequence is maintained.

The `insert` elements can be used by tool developers as insertion points for data items that the tool may manage as parameters. The use of `insert` within an OSCAL `part` is described on the NIST OSCAL Concepts page.

Representation

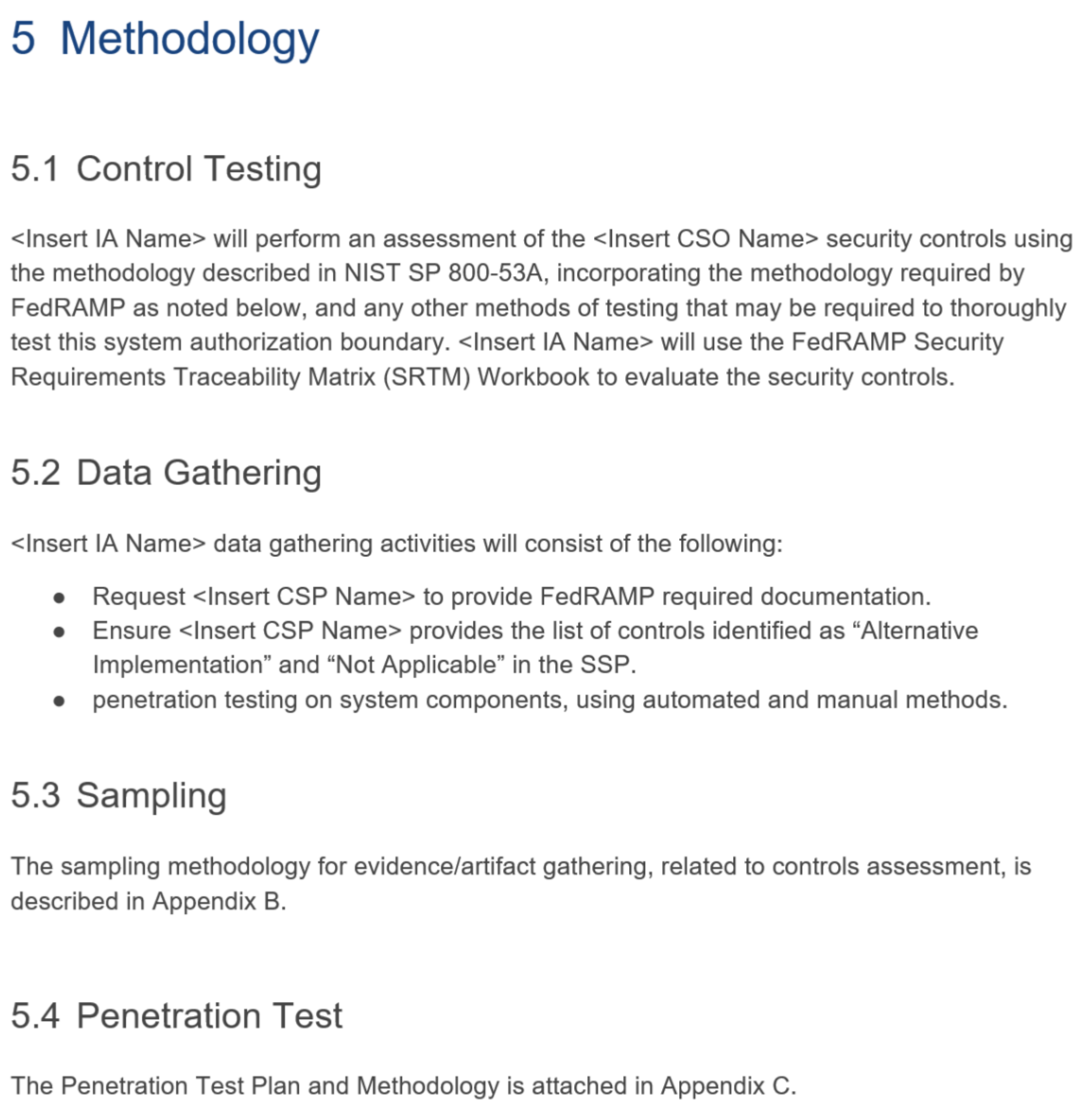
```
<terms-and-conditions>
    <part name="assumptions">
        <part name="assumption">
            <prop name="sort-id" value="001"/>
            <p>This SAP is based on <insert type="param" id-ref="cso_name_prm"/>...</p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="002"/>
            <p>The <insert type="param" id-ref="csp_name_prm"/> ... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="003"/>
            <p>The <insert type="param" id-ref="ia_name_prm"/> ... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="004"/>
            <p>The <insert type="param" id-ref="csp_name_prm"/>... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="005"/>
            <p>Security controls that ... on these security controls.</p>
        </part>
    </part>
</terms-and-conditions>
```

XPath Queries

```
(SAP) Obtain Sort IDs, for sorting by the SAP tool:
  /*/terms-and-conditions/part[@name='assumptions']/
  part[@name='assumption']/prop[@name='sort-id']

(SAP) The first assumption statement:
  /*/terms-and-conditions/part[@name='assumptions']/
  part[@name='assumption']/prop[@name='sort-id'] [.='001']/../(* except prop)

NOTE: Replace '001' with '002', '003', etc. for each sort-id based on desired order.
```

NOTES:

- If the tool is using XPath 1.0 or 2.0, the tool must sort the results of the sort-id list, and then obtain the assumptions in the intended sequence. XPath 3.0 has a sort function, which can perform the sort for the tool.
- OSCAL does not support the insertion of values within Markup Multiline at this time. The tool must either replace each "[CSP Name]" and "[3PAO Name]" with the appropriate value or enable the assessor to manually make those changes. This feature may be added to future version of OSCAL.



5 Methodology

5.1 Control Testing

<Insert IA Name> will perform an assessment of the <Insert CSO Name> security controls using the methodology described in NIST SP 800-53A, incorporating the methodology required by FedRAMP as noted below, and any other methods of testing that may be required to thoroughly test this system authorization boundary. <Insert IA Name> will use the FedRAMP Security Requirements Traceability Matrix (SRTM) Workbook to evaluate the security controls.

5.2 Data Gathering

<Insert IA Name> data gathering activities will consist of the following:

- Request <Insert CSP Name> to provide FedRAMP required documentation.
- Ensure <Insert CSP Name> provides the list of controls identified as “Alternative Implementation” and “Not Applicable” in the SSP.
- penetration testing on system components, using automated and manual methods.

5.3 Sampling

The sampling methodology for evidence/artifact gathering, related to controls assessment, is described in Appendix B.

5.4 Penetration Test

The Penetration Test Plan and Methodology is attached in Appendix C.

The part assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.4 SAP Methodology

In general, the methodology is simply a single markup multiline field, which enables the assessor to modify the content using rich text formatting. The FedRAMP SAP template includes subsections for *Control Testing, Data Gathering, Sampling,* and *Penetration Test*. Each of these sections must be present in the FedRAMP OSCAL SAP `terms-and-condition` assembly, within `part` named ”methodology” as sub-parts. The subparts are specifically defined for FedRAMP SAP, so they have namespace “https://fedramp.gov/ns/oscal” and attributes are named “control-testing”, “data-gathering”, “sampling”, and “pen-testing”.

Representation

```
<terms-and-conditions>
      <!-- Section 5 -->
      <part name="methodology">
         <title>Methodology</title>
         <!-- Section 5.1 Control Testing -->
         <part ns="https://fedramp.gov/ns/oscal" name="control-testing">
            <title>Control Testing</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="001"/>
            <p>[IA Name] will ... </p>
         </part>
         <!-- Section 5.2 Data Gathering -->
         <part ns="https://fedramp.gov/ns/oscal" name="data-gathering">
            <title>Data Gathering</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="002"/>
            <p>[IA Name] data gathering activities will ... </p>
         </part>
         <!-- Section 5.3 Sampling -->
         <part ns="https://fedramp.gov/ns/oscal" name="sampling">
            <title>Sampling</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="003"/>
            <prop ns="https://fedramp.gov/ns/oscal" name="sampling" value="no"/>
            <p>The sampling methodology for evidence/artifact gathering, related to
controls assessment, is described in Appendix B.</p>
            <p>[IA Name] [will/will not] ... </p>
          </part>
         <!-- Section 5.4 Penetration Test -->
         <part ns="https://fedramp.gov/ns/oscal" name="pen-testing">
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="004"/>
            <p>The Penetration Test Plan and Methodology is attached in Appendix C.</p>
         </part>
      </part>
     <!-- cut -->
</terms-and-conditions>
```

5.3 Sampling

The sampling methodology for evidence/artifact gathering, related to controls assessment, is described in Appendix B.

Instruction:

The IA must assess a sampling of components for vulnerability scanning in accordance with FedRAMP Guide for Determining Eligibility and Requirements for the Use of Sampling for Vulnerability Scans. For an initial assessment, 100% of the inventory must be scanned or the sampling methodology must ascertain that the sampling does represent 100% of the system inventory. A sampling of the assets within each of the standard system images is considered sufficient. The IA must attest that the sample selected is sufficient to represent the state of the unique inventory.

When the IA is considering sampling methods for testing controls, the IA must attest that the sample selected (e.g., account requests/terminations/transfers process, change control process, etc) is sufficient to represent the unique state of the system and status of the control being tested.

Delete this instructional text from your final version of this document.

FedRAMP Extension (Sampling Plans)

prop (`ns="https://fedramp.gov/ns/oscal"`):

- `name="sampling"`

FedRAMP requires the presence of the `sampling` property, which indicates whether sampling will be used by the assessor for the assessment. The `insert` elements can be used by tool developers for insertion points for data items that the tool may manage as parameters. CSP tools must display a definitive statement based on the value of the `sampling` property.

Representation

```
<terms-and-conditions>
      <!-- Section 5 -->
      <part name="methodology">
         <title>Methodology</title>

         <!-- Section 5.3 Sampling -->
         <part ns="https://fedramp.gov/ns/oscal" name="sampling">
            <title>Sampling</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="003"/>
            <prop ns="https://fedramp.gov/ns/oscal" name="sampling" value="no"/>
            <p>The sampling methodology for evidence/artifact gathering, related to
controls assessment, is described in Appendix B.</p>
            <p>[IA Name] [will/will not] ... </p>
          </part>

      </part>
     <!-- cut -->
</terms-and-conditions>
```

XPath Queries

```
(SAP) Will the assessor use sampling?:
  /*/terms-and-conditions/part[@name='methodology']/prop[@name='sampling']/@value
(SAP) Methodology Description:
  /*/terms-and-conditions/part[@name='methodology']/(* except prop)
```

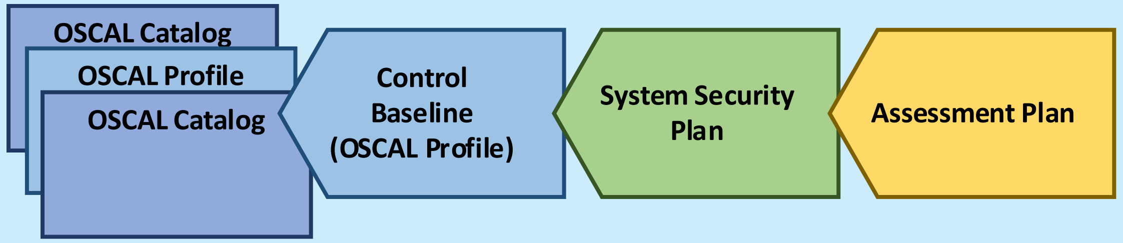
NOTES:

- The SAP tool should provide the assessor with an automated way to replace [CSP Name] and [3PAO Name] with the actual names of those parties.
- The SAP tool should allow the assessor to modify this content as needed.

IMPORTANT

SAP tools must import (open) the OSCAL-based SSP, then use the SSP content to import (open) the FedRAMP Control Baseline (profile). It may also be necessary to open any catalogs or additional profiles called by the SSP's profile.

This provides access to all controls in the baseline, including control objectives, and control assessment activities, as well as any FedRAMP modifications. To reduce processing, a tool may link to a "resolved profile catalog" version of the baseline, which represents a pre-processing of the profile and catalog data.



Traverse the OSCAL stack for control scope and details.

Control selection is limited in scope to the controls resulting from the SSP's profile.

HELPFUL HINT

When processing an OSCAL-based FedRAMP baseline (profile or resolved-profile-catalog) for annual assessment inclusion, the FedRAMP core/critical controls are identified with the FedRAMP Extension, "CORE". (`<prop name='CORE' ns='https://fedramp.gov/ns/oscal' value=’true’/>`)

4.5 Control Testing

An OSCAL SAP must always explicitly select the in-scope controls from the applicable FedRAMP Baseline/Profile. For initial assessments, this can be as simple as specifying `include-all`. For annual assessments, use `include-control` instead - one for each control included in the assessment. Controls may also be explicitly excluded from the control scope.

Representation

```
<!-- metadata -->
<reviewed-controls>
    <control-selection>
        <description>
            <p>Include all controls in the baseline.</p>
            <p>Then exclude any specific controls if necessary.</p>
            <p>Provide rationale/justification for control exclusion here.</p>
        </description>
        <include-all />
        <exclude-control control-id="ac-1" />
        <!-- OR -->
        <include-control control-id="ac-2" />
        <include-control control-id="ac-3" />
        <!-- repeat as needed for each control -->
    </control-selection>
    <!-- control-objectives -->
    <!-- objectives -->
    <control-objective-selection><!-- cut --></control-objective-selection>
</reviewed-controls>
<!-- assessment-subject -->
```

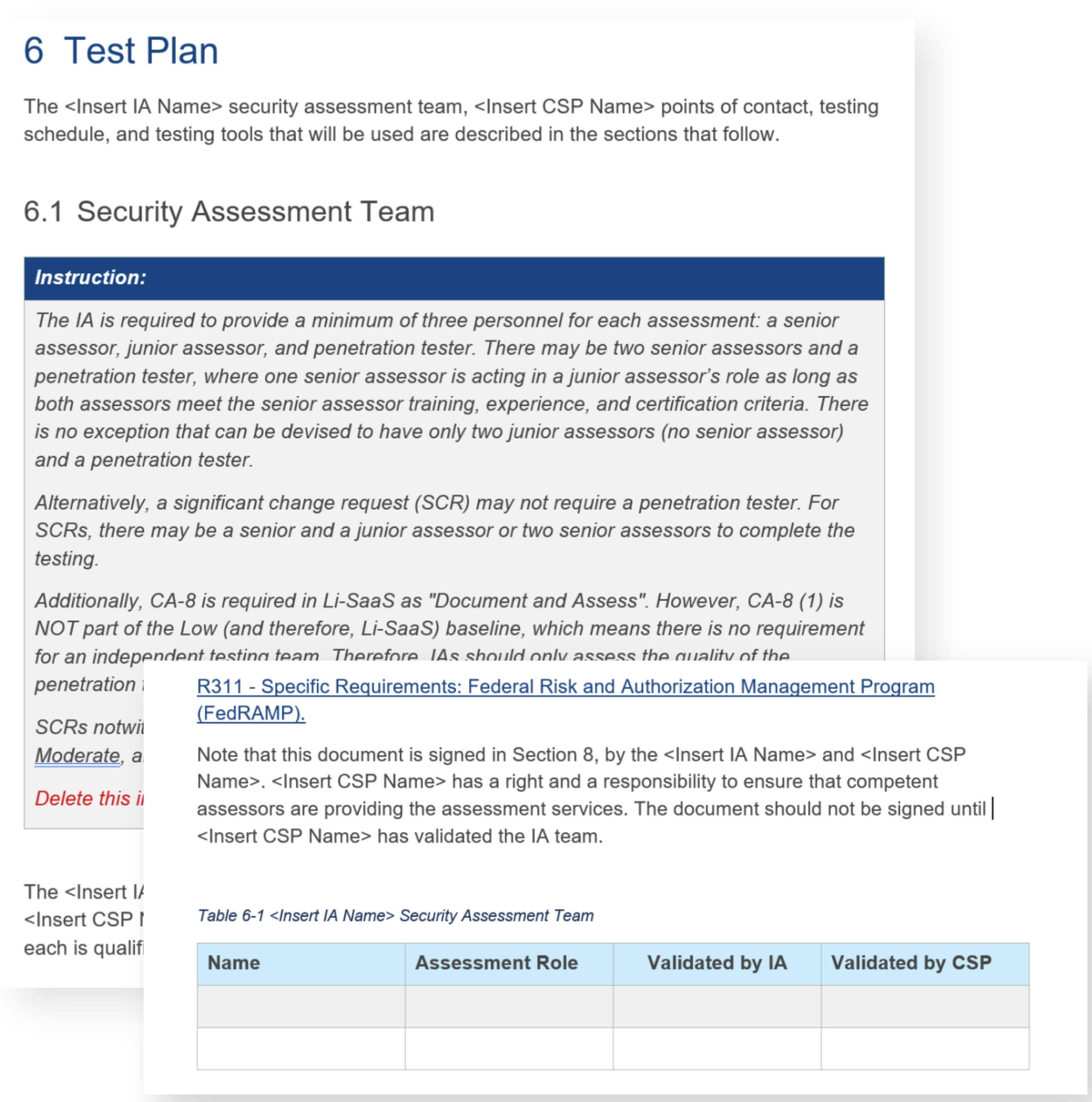
XPath Queries

```
(SAP) Include All Controls? (true or false):
  boolean(/*/objectives/controls/include-all)

(SAP) Exclude Controls Specified? (true or false):
  boolean(/*/objectives/controls/exclude-control)

(SAP) Exclude Controls Total (integer):
  count(/*/objectives/controls/exclude-control)

(SAP) Exclude Specific Control (string):
  /*/objectives/controls/exclude-control[1]/@control-id

NOTE: Replace "exclude-control" with "include-control" above for any explicitly included
  controls; however, this is redundant when used with 'all'.
```

```
Replace "[1]" with
"[2]", "[3]", etc.
```

NOTES:

- Tools should validate the control IDs for explicitly included or excluded controls using the relevant baseline.
- FedRAMP's guidance and requirements regarding which controls are in-scope for each assessment does not change with OSCAL.



6 Test Plan

The <Insert IA Name> security assessment team, <Insert CSP Name> points of contact, testing schedule, and testing tools that will be used are described in the sections that follow.

6.1 Security Assessment Team

Instruction:

The IA is required to provide a minimum of three personnel for each assessment: a senior assessor, junior assessor, and penetration tester. There may be two senior assessors and a penetration tester, where one senior assessor is acting in a junior assessor's role as long as both assessors meet the senior assessor training, experience, and certification criteria. There is no exception that can be devised to have only two junior assessors (no senior assessor) and a penetration tester.

Alternatively, a significant change request (SCR) may not require a penetration tester. For SCRs, there may be a senior and a junior assessor or two senior assessors to complete the testing.

Additionally, CA-8 is required in Li-SaaS as "Document and Assess". However, CA-8 (1) is NOT part of the Low (and therefore, Li-SaaS) baseline, which means there is no requirement for an independent testing team. Therefore, IAs should only assess the quality of the penetration

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R311 - Specific Requirements: Federal Risk and Authorization Management Program (FedRAMP).

Note that this document is signed in Section 8, by the <Insert IA Name> and <Insert CSP Name>. <Insert CSP Name> has a right and a responsibility to ensure that competent assessors are providing the assessment services. The document should not be signed until <Insert CSP Name> has validated the IA team.

Table 6-1 <Insert IA Name> Security Assessment Team

Name	Assessment Role	Validated by IA	Validated by CSP

4.6 SAP Test Plan

4.6.1 Assessor's Name, Address, and URL

The SAP's metadata is used to represent the assessor's name address and URL. This uses the OSCAL common `role`, `party`, and `responsible-party` assemblies. Some `roles` are specific to the SAP. In the `responsible-party` assembly, the `party-uuid` may point to a party in the SSP or SAP. The SAP tool must not assign a role ID or party ID that duplicates one used in the SSP.

Representation

```
<metadata>
    <!-- cut: title, published, last-modified, version, oscal-version, prop -->
    <role id="assessor">
        <title>Assessment Organization</title>
        <desc>The organization performing the assessment.</desc>
    </role>
    <location uuid="uuid-value">
        <address type="work">
            <addr-line>Suite 0000</addr-line>
            <addr-line>1234 Some Street</addr-line>
            <city>Haven</city>
            <state>ME</state>
            <postal-code>00000</postal-code>
            <country>US</country>
        </address>
    </location>
    <party uuid="uuid-value"  type="organization">
        <name>Assessment Organization Name</name>
        <short-name>Acronym/Short Name</short-name>
        <location-uuid>sap-location-1</location-uuid>
        <url>https://assesor.web.site</url>
        <prop name="iso-iec-17020-identifier"
            ns='https://fedramp.gov/ns/oscal'>0000.00</prop>
    </party>
    <responsible-party role-id="assessor">
        <party-uuid>uuid-of-assessor</party-uuid>
    </responsible-party>
</metadata>
```

FedRAMP Defined Identifier

role ID: `assessor`

FedRAMP Extension (A2LA Certification #)

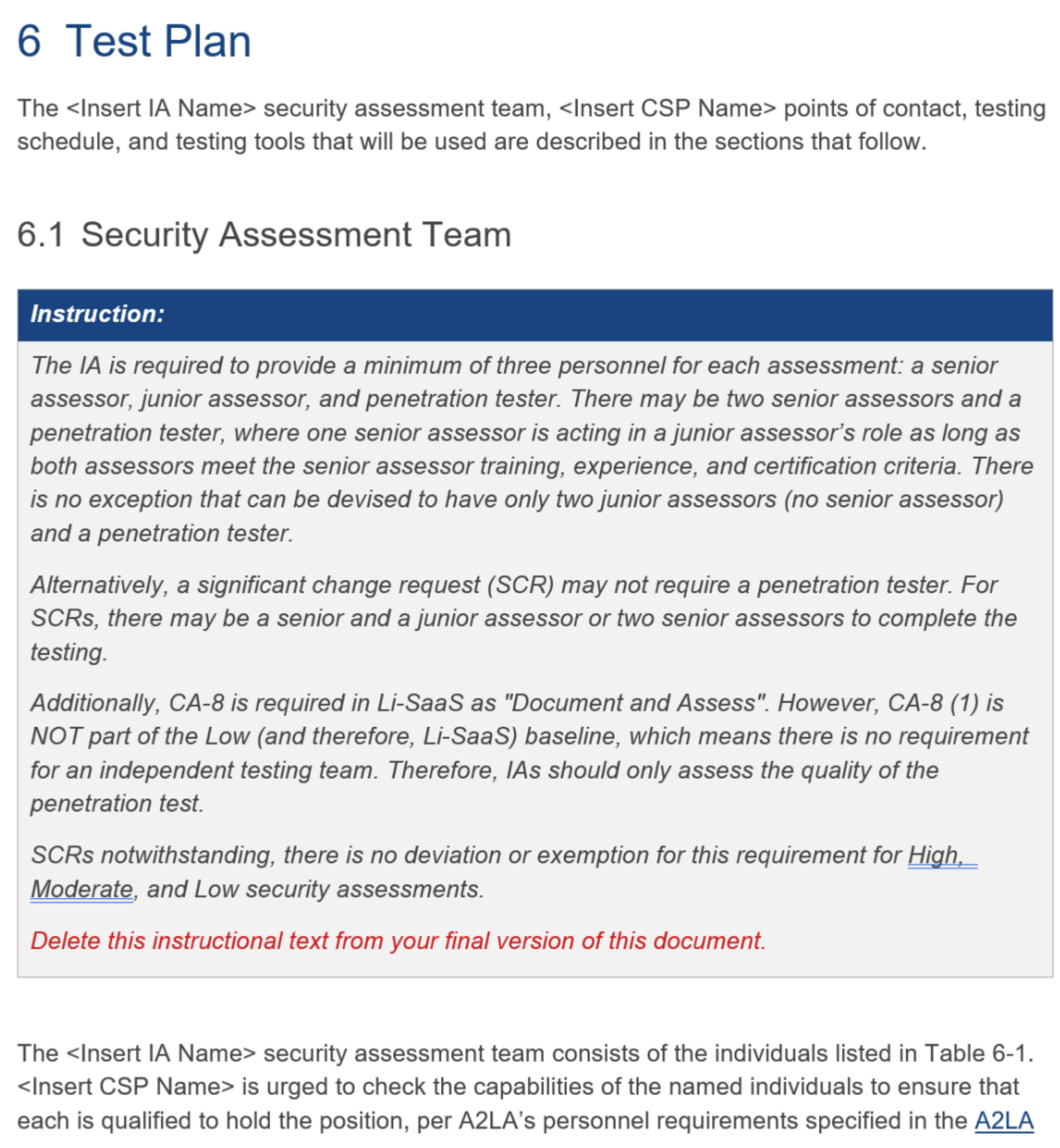
prop (ns="`https://fedramp.gov/ns/oscal`"):

- `name="iso-iec-17020-identifier"`

XPath Queries

```
(SAP) Assessor's Name:
  /*/metadata/party[@id=(/*/metadata/responsible-party[@role-id='assessor']/party-uuid)]
  /org/org-name

(SAP) Assessor's Street Address (replace addr-line with city, state, etc.):
  /*/metadata/location[@id=/*/metadata/party[@id=(/*/metadata/responsible-party[@role-
  id='assessor']/party-uuid)]/org/location-id]/address/addr-line
```

```
(SAP) Assessor's Web Site:
  /*/metadata/party[@id=(/*/metadata/responsible-party[@role-id='assessor']/party-uuid)]
  /org/url

(SAP) 3PAO's A2LA Certification Number:
  /*/metadata/party[@id=(/*/metadata/responsible-party[@role-id='assessor']/party-uuid)]
  /org/prop[@name='iso-iec-17020-identifier'][@ns='https://fedramp.gov/ns/oscal']
```



6 Test Plan

The <Insert IA Name> security assessment team, <Insert CSP Name> points of contact, testing schedule, and testing tools that will be used are described in the sections that follow.

6.1 Security Assessment Team

Instruction:

The IA is required to provide a minimum of three personnel for each assessment: a senior assessor, junior assessor, and penetration tester. There may be two senior assessors and a penetration tester, where one senior assessor is acting in a junior assessor's role as long as both assessors meet the senior assessor training, experience, and certification criteria. There is no exception that can be devised to have only two junior assessors (no senior assessor) and a penetration tester.

Alternatively, a significant change request (SCR) may not require a penetration tester. For SCRs, there may be a senior and a junior assessor or two senior assessors to complete the testing.

Additionally, CA-8 is required in Li-SaaS as "Document and Assess". However, CA-8 (1) is NOT part of the Low (and therefore, Li-SaaS) baseline, which means there is no requirement for an independent testing team. Therefore, IAs should only assess the quality of the penetration test.

SCRs notwithstanding, there is no deviation or exemption for this requirement for High, Moderate, and Low security assessments.

Delete this instructional text from your final version of this document.

The <Insert IA Name> security assessment team consists of the individuals listed in Table 6-1. <Insert CSP Name> is urged to check the capabilities of the named individuals to ensure that each is qualified to hold the position, per A2LA's personnel requirements specified in the A2LA

4.6.2 Security Assessment Team

The SAP's metadata is used to represent the assessment team and assessment lead. This uses the OSCAL common `role`, `party`, and `responsible-party` assemblies. Some `roles` are specific to the SAP. The SAP tool must not assign a role ID or party ID that duplicates one used in the SSP.

Representation

```
<metadata>
    <!-- cut: title, published, last-modified, version, oscal-version, prop -->
    <role id="assessment-team">
        <title>Assessment Team</title>
        <desc>The individual or individuals performing the assessment.</desc>
    </role>
    <party id="sap-person-2"  type="person">
        <person-name>[SAMPLE]Person Name 2</person-name>
        <org-id>assessment-org</org-id>
        <location-id>sap-location-1</location-id>
        <email>name@org.domain</email>
        <phone>202-000-0000</phone>
    </party>
    <!-- Repeat party for each person 3 - 5 -->
    <responsible-party role-id="assessment-team">
        <party-uuid>sap-person-2</party-uuid>
        <party-uuid>sap-person-3</party-uuid>
        <party-uuid>sap-person-4</party-uuid>
        <party-uuid>sap-person-5</party-uuid>
    </responsible-party>
</metadata>
```

FedRAMP Defined Identifier

role ID: `assessment-team`

XPath Queries

```
(SAP) Number of Assessment Team Members (integer):
  count(/*/metadata/responsible-party[@role-id='assessment-team']/party-uuid)

(SAP) Name of First Assessment Team Member:
  /*/metadata/party[@id=/*/metadata/responsible-party[@role-id='assessment-team']
  /party-uuid[1]]/person/person-name

(SAP) Role of First Assessment Team Member:
  /*/metadata/role[@id='assessment-team']/title

(SAP) Contact Information of First Assessment Team Member (phone):
  /*/metadata/party[@id=/*/metadata/responsible-party[@role-id='assessment-team']
  /party-uuid[1]]/person/phone

NOTE: Replace 'phone' with 'email'

NOTE: Replace [1] as needed with [2], [3], etc.
```

6.2 CSP Testing Points of Contact (POCs)

Instruction:

The IA must obtain at least three POCs from the CSP to use for testing communications. One of the contacts must be an "on call" team member who has points of contact (POC) with the operations center (e.g., NOC and SOC). The CSP POCs listed must be those who actively participate in the assessment effort and participate in meetings with the JAB, agency partner, and FedRAMP PMO.

Delete this instructional text from your final version of this document.

The <Insert CSP Name> POCs are found in Table 6-2. <Insert IA Name> has internal processes to contact the CSP should the need arise.

Table 6-2 <Insert CSP Name> Points of Contact

Name	Role

4.6.3 CSP Testing Points of Contact

The SAP's metadata is used to represent the CSP's points of contact. This uses the OSCAL common `role`, `party`, and `responsible-party` assemblies. In the `responsible-party` assembly, the `party-uuid` may point to a party in the SSP or SAP. The SAP tool must not assign a role ID or party ID that duplicates one used in the SSP. If an individual is already identified via a party assembly in the SSP, that individual's information should not be duplicated in the SAP. Instead, the SAP should reference the SSP party ID for that individual.

Representation

```
<metadata>
    <role id="csp-assessment-poc">
        <title>CSP POCs During Testing</title>
        <desc>At least three CSP POCs must be identified in a FedRAMP SAP.</desc>
    </role>

    <!-- Only define a CSP party in the SAP when no appropriate party exits in SSP -->

    <responsible-party role-id="csp-assessment-poc">
        <!-- At least three -->
        <party-uuid>person-1</party-uuid>
        <party-uuid>person-2</party-uuid>
        <party-uuid>soc</party-uuid>
    </responsible-party>
</metadata>
```

FedRAMP Defined Identifier

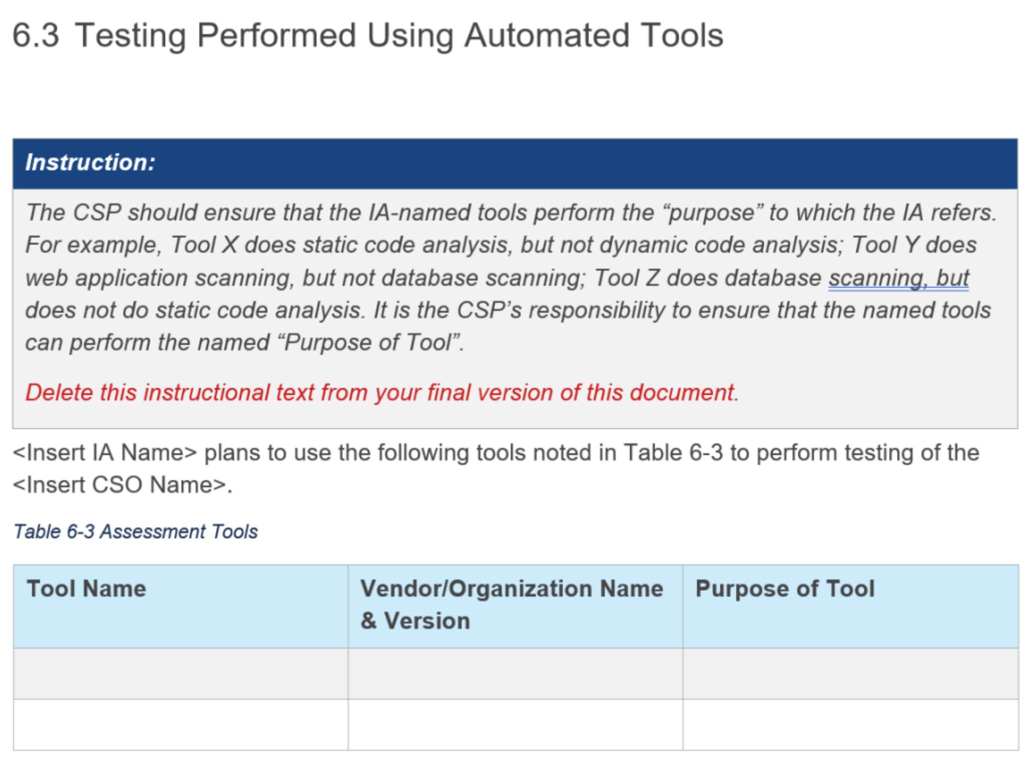
role ID: `csp-assessment-poc`

XPath Queries

```
(SAP) Number of CSP Assessment POCs (integer):
  count(/*/metadata/responsible-party[@role-id='csp-assessment-poc']/party-uuid)
(SAP) ID of the first CSP Assessment POC:
  /*/metadata/responsible-party[@role-id='csp-assessment-poc']/party-uuid[1]
NOTE: Replace [1] as needed with [2], [3], etc.
(SAP) Role:
  /*/metadata/role[@id='csp-assessment-poc']/title
(SSP) Name of the first person or organization:
  /*/metadata/party[@id='person-1']/(./person/person-name | ./org/org-name)
(SSP) Phone for the first person or organization:
  /*/metadata/party[@id='person-1']//phone
(SSP) Email for the first person or organization:
  /*/metadata/party[@id='person-1']//email
NOTE: Replace 'person-1' with each party-uuid found in the responsible role.
```

NOTES:

- IDs used for roles or parties in the SAP must not duplicate IDs used for roles or parties in the SSP.
- Only define a CSP party in the SAP when no appropriate party exists in the SSP.



6.3 Testing Performed Using Automated Tools

Instruction:

The CSP should ensure that the IA-named tools perform the "purpose" to which the IA refers. For example, Tool X does static code analysis, but not dynamic code analysis; Tool Y does web application scanning, but not database scanning; Tool Z does database scanning, but does not do static code analysis. It is the CSP's responsibility to ensure that the named tools can perform the named "Purpose of Tool".

Delete this instructional text from your final version of this document.

<Insert IA Name> plans to use the following tools noted in Table 6-3 to perform testing of the <Insert CSO Name>.

Table 6-3 Assessment Tools

Tool Name	Vendor/Organization Name & Version	Purpose of Tool

The `description` field is *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.6.4 Testing Performed Using Automated Tools

Automated tools are enumerated in the assets section of the SAP using the tools assembly. Each tool is listed using the same component syntax available in the SSP.

Representation

```
<assessment-assets >
    <component uuid="assessor-component1-uuid" type="software">
        <title>XYZ Vulnerability Scanning Tool</title>
        <description>
            <p>Describe the purpose of the tool here.</p>
        </description>
        <prop name="vendor" value="Vendor Name"/>
        <prop name="name" value="Tool Name"/>
        <prop name="version" value="1.2.3"/>
        <status state="operational"/>
    </component>

    <component uuid="assessor-componenet2-uuid" type="software">
        <title>XYZ Database Scanning Tool</title>
        <description>
            <p>Describe the purpose of the tool here.</p>
        </description>
        <prop name="vendor" value="Vendor Name"/>
        <prop name="name" value="Tool Name"/>
        <prop name="version" value="1.2.3"/>
        <status state="operational"/>
        <remarks><p><!-- cut --></p></remarks>
    </component>
</assessment-assets >
<!-- assessment-activities  -->
```

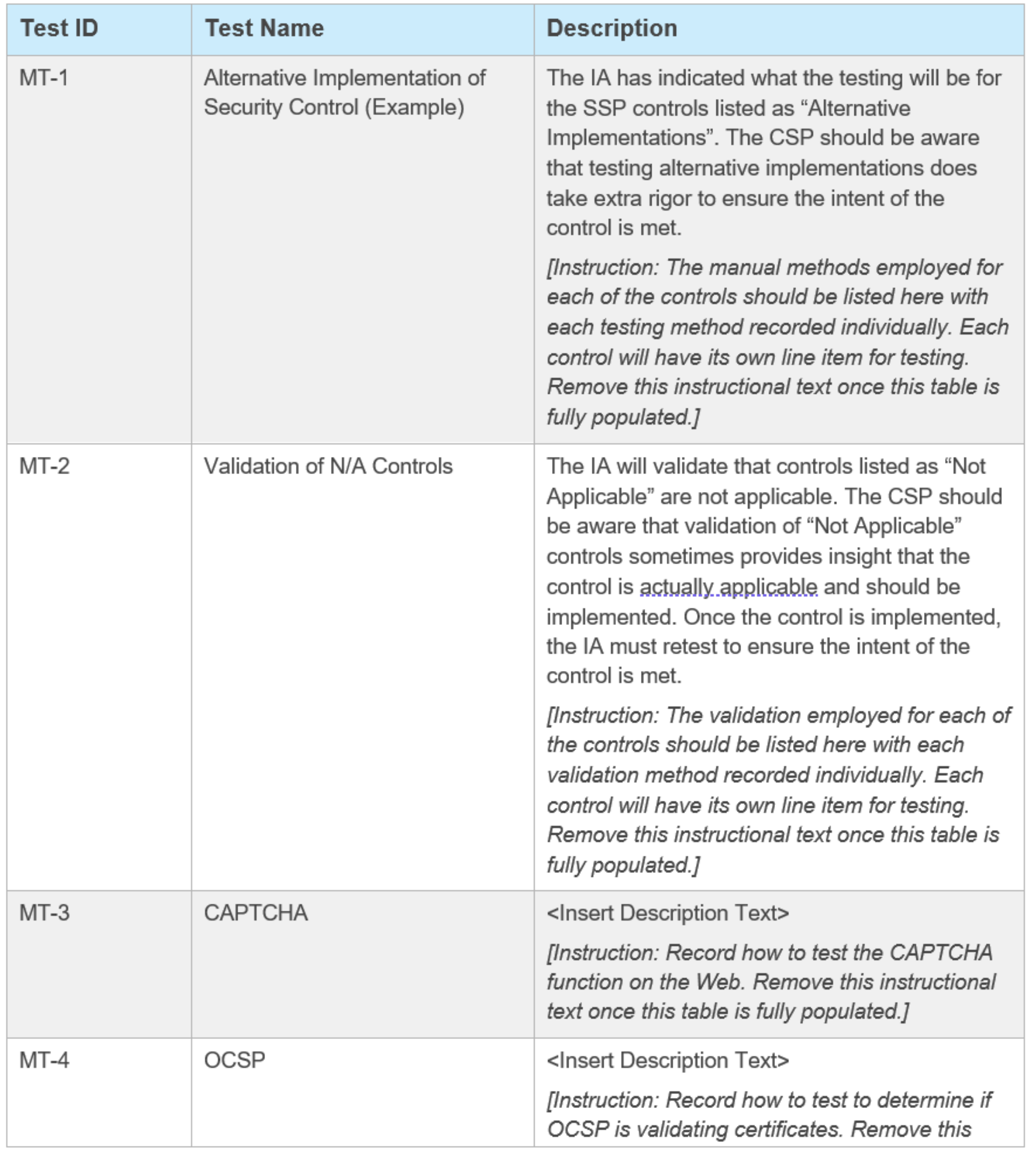
XPath Queries

```
(SAP) Number of Tools (integer):
  count(/*/assessment-assets/component)
(SAP) Name of first tool:
  /*/assessment-assets/component[1]/prop[@name='name']/@value
(SAP) Vendor/Organization Name of first tool:
  /*/assessment-assets/component[1]/prop[@name='vendor']/@value
(SAP) Version of first tool:
  /*/assessment-assets/component[1]/prop[@name='version']/@value
(SAP) Purpose of first tool:
  /*/assessment-assets/component[1]/description/node()
NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- OSCAL syntax requires a `status` field within each `component` assembly. For FedRAMP, assessment tools `state` should typically be '`operational`', otherwise a remark must be provided.

Table 6-4 Testing Performed Through Manual Methods



Test ID	Test Name	Description
MT-1	Alternative Implementation of Security Control (Example)	The IA has indicated what the testing will be for the SSP controls listed as “Alternative Implementations”. The CSP should be aware that testing alternative implementations does take extra rigor to ensure the intent of the control is met. *[Instruction: The manual methods employed for each of the controls should be listed here with each testing method recorded individually. Each control will have its own line item for testing. Remove this instructional text once this table is fully populated.]*
MT-2	Validation of N/A Controls	The IA will validate that controls listed as “Not Applicable” are not applicable. The CSP should be aware that validation of “Not Applicable” controls sometimes provides insight that the control is actually applicable and should be implemented. Once the control is implemented, the IA must retest to ensure the intent of the control is met. *[Instruction: The validation employed for each of the controls should be listed here with each validation method recorded individually. Each control will have its own line item for testing. Remove this instructional text once this table is fully populated.]*
MT-3	CAPTCHA	<Insert Description Text> *[Instruction: Record how to test the CAPTCHA function on the Web. Remove this instructional text once this table is fully populated.]*
MT-4	OCSP	<Insert Description Text> *[Instruction: Record how to test to determine if OCSP is validating certificates. Remove this*

The `description` field is *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the [Guide to OSCAL-based FedRAMP Content](), *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.6.5 Testing Performed Through Manual Methods

In OSCAL, the manual assessment methods are described in the `activity` assembly as shown below:

Representation

```
<local-definitions>
    <activity uuid="2715174e-9355-4775-bea4-4068e59e916b">
        <title>Title of the Manual Test</title>
        <description>
            <p>Description of the manual test</p>
        </description>
        <prop name="type" value="manual"/>
        <prop name="label" value="Test ID"/>
        <step uuid="fb039fd7-5a2b-4c0f-867c-88cce9c3778c ">
            <description><p>Describe test step #1</p></description>
            <prop name="sort-id" value="001"/>
        </step>
        <step uuid="fb039fd7-5a2b-4c0f-867c-88cce9c3778c ">
            <description><p>Describe test step #2</p></description>
            <prop name="sort-id" value="002"/>
        </step>
        <step uuid="fb039fd7-5a2b-4c0f-867c-88cce9c3778c ">
            <description><p>Describe test step #3</p></description>
            <prop name="sort-id">003</prop>
        </step>
    </activity>
    <activity uuid="3ba68918-80ef-4846-89e0-9f1def7e5223">
        <title>[SAMPLE]Forceful Browsing</title>
        <description>
            <p>We will login as a customer ...cut... browser to various URLs</p>
        </description>
        <prop name="type" value="manual"/>
        <prop name="label" value="Test ID"/>
    </activity>
</local-definitions>
```

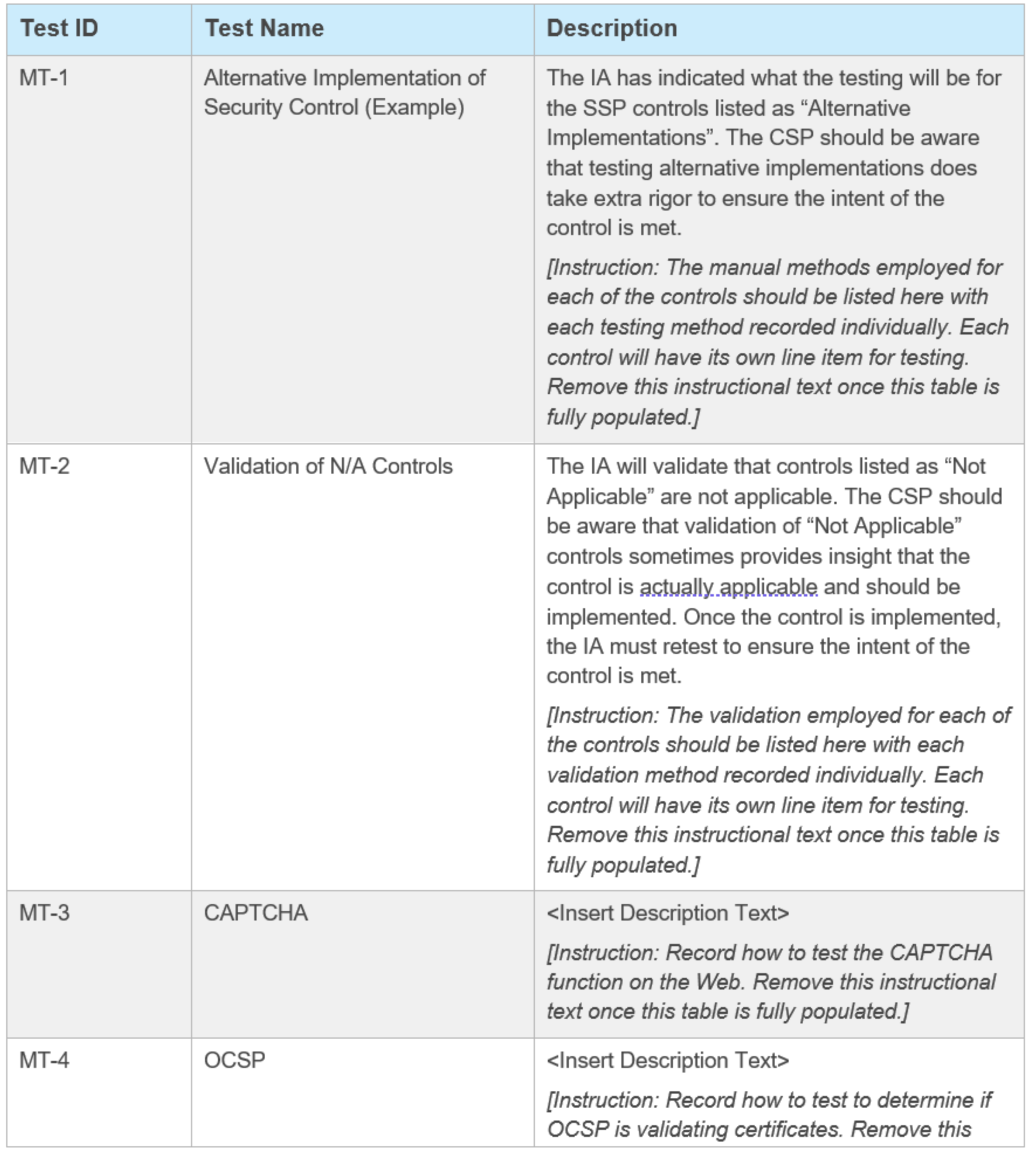
XPath Queries

```
(SAP) Number of manual test methods (integer):
  count(/*/local-definitions/activity[prop[@name='type'][@value='manual']])
(SAP) Test ID of first manual test method:
  (/*/local-definitions/activity[prop[@name='type'][@value='manual']])
  [1]/prop[@name='label']
(SAP) Test Name of first manual test method:
  (/*/local-definitions/activity[prop[@name='type'][@value='manual']]) [1]/title
(SAP) Description of first manual test method:
  (/*/local-definitions/activity[prop[@name='type'][@value='manual']])
  [1]/description/node()
NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- If a test method represents more than one test type, such as manual test that is also a role-based test, the `test-type` property should appear twice, indicating each type.

Table 6-4 Testing Performed Through Manual Methods



Test ID	Test Name	Description
MT-1	Alternative Implementation of Security Control (Example)	The IA has indicated what the testing will be for the SSP controls listed as "Alternative Implementations". The CSP should be aware that testing alternative implementations does take extra rigor to ensure the intent of the control is met. *[Instruction: The manual methods employed for each of the controls should be listed here with each testing method recorded individually. Each control will have its own line item for testing. Remove this instructional text once this table is fully populated.]*
MT-2	Validation of N/A Controls	The IA will validate that controls listed as "Not Applicable" are not applicable. The CSP should be aware that validation of "Not Applicable" controls sometimes provides insight that the control is actually applicable and should be implemented. Once the control is implemented, the IA must retest to ensure the intent of the control is met. *[Instruction: The validation employed for each of the controls should be listed here with each validation method recorded individually. Each control will have its own line item for testing. Remove this instructional text once this table is fully populated.]*
MT-3	CAPTCHA	<Insert Description Text> *[Instruction: Record how to test the CAPTCHA function on the Web. Remove this instructional text once this table is fully populated.]*
MT-4	OCSP	<Insert Description Text> *[Instruction: Record how to test to determine if OCSP is validating certificates. Remove this*

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content, Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.6.5.1 Including Manual Test Methods in the OSCAL SAP Test Plan Section

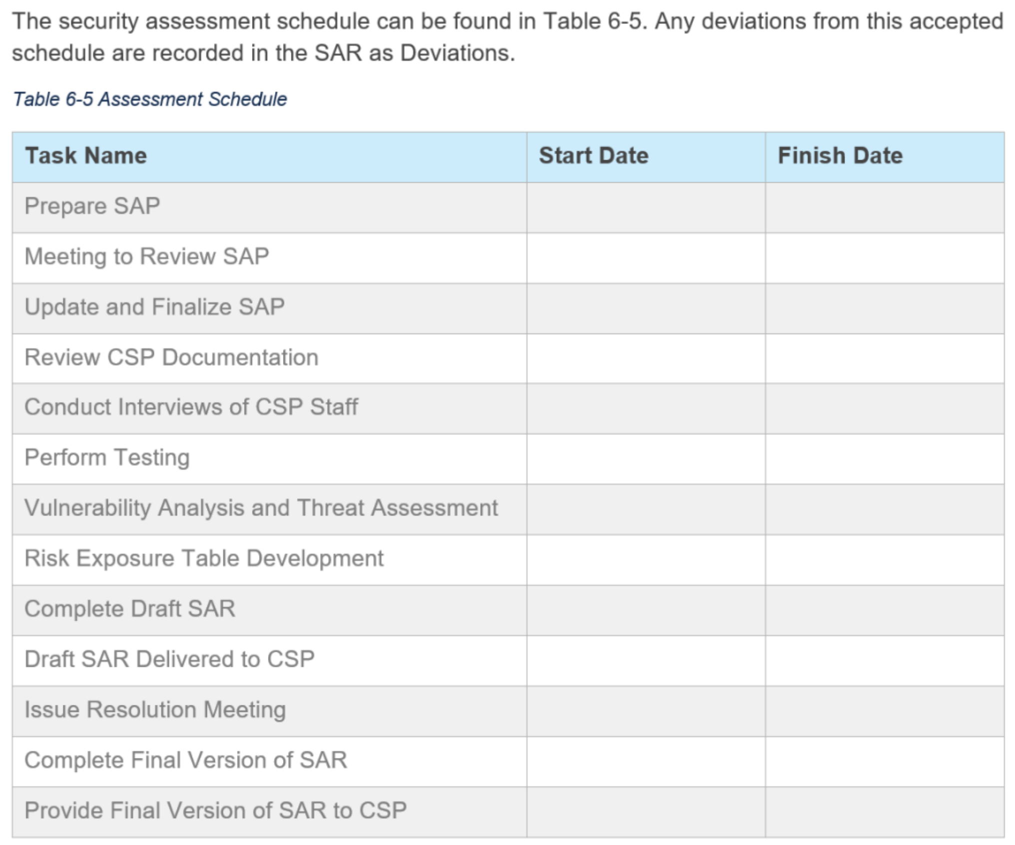
The FedRAMP OSCAL SAP `terms-and-condition` assembly, should contain a `part` with `ns`="https://fedramp.gov/ns/oscal" `name`="manual-methods-testing" when needed to facilitate rending of OSCAL SAP by tools. The `insert` elements can be used by tool developers as insertion points for data items such as test ID, test name, and test description if the tool is able manage them as parameters. The use of `insert` within an OSCAL `part` is described on the NIST OSCAL Concepts page. The XPath queries below show how to identify manual test information within the OSCAL SAP.

Representation

```
<terms-and-conditions>
      <!-- Section 6 Test Plan -->
      <part ns="https://fedramp.gov/ns/oscal" name="test-plan">
         <title>Test Plan</title>
         <!-- Section 6.4 Testing performed using manual methods -->
         <part ns="https://fedramp.gov/ns/oscal" name="manual-methods-testing">
            <title>Testing Performed Using Manual Methods</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="004"/>
            <!-- Table 6-4 Describe what technical tests will be performed through
manual methods without the use of automated tools. -->
            <table>
               <tr>
                  <th>Test ID</th>
                  <th>Test Name</th>
                  <th>Description</th>
               </tr>
               <tr>
                  <!-- Identifiers must be in the format MT-1, MT-2, etc., which
indicates "Manual Test 1", "Manual Test 2", etc. -->
                  <td>[Insert test ID]</td>
                  <td>[Insert test name]</td>
                  <td>[Insert test description text]</td>
               </tr>
            </table>
         </part>
      </part>
     <!-- cut -->
</terms-and-conditions>
```

XPath Queries

```
(SAP) Test ID:
  /assessment-plan/local-
  definitions[1]/activity[1]/prop[@ns="https://fedramp.gov/ns/oscal" and
  @name="label"]/@value
(SAP) Test Name:
  /assessment-plan/local-definitions[1]/activity[1]/title
(SAP) Description:
  /assessment-plan/local-definitions[1]/activity[1]/description/p
NOTE: Replace [1] as needed with [2], [3], etc.
```



The security assessment schedule can be found in Table 6-5. Any deviations from this accepted schedule are recorded in the SAR as Deviations.

Table 6-5 Assessment Schedule

Task Name	Start Date	Finish Date
Prepare SAP		
Meeting to Review SAP		
Update and Finalize SAP		
Review CSP Documentation		
Conduct Interviews of CSP Staff		
Perform Testing		
Vulnerability Analysis and Threat Assessment		
Risk Exposure Table Development		
Complete Draft SAR		
Draft SAR Delivered to CSP		
Issue Resolution Meeting		
Complete Final Version of SAR		
Provide Final Version of SAR to CSP		

The `description` field is *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit:
https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline

4.6.6 Schedule

In OSCAL, the assessment schedule is described using an array of `task` assemblies as shown below:

Representation

```
<task uuid="17030aaf-7712-4228-8607-a5a97a785efa" type="action">
    <title>Prepare Test Plan</title>
    <description>
        <p>optional description here</p>
    </description>
    <timing>
        <within-date-range start="2020-06-01T00:00:00Z" end="2020-06-15T00:00:00Z"/>
    </timing>
</task>
<task uuid="b65e7779-bd3d-4a49-9de5-3122c290792f" type="action">
    <title>Meeting to Review Test Plan</title>
    <description>
        <p>optional description here</p>
    </description>
    <timing>
        <within-date-range start="2020-06-01T00:00:00Z" end="2020-06-15T00:00:00Z"/>
    </timing>
</task>
```

XPath Queries

```
(SAP) Number of tasks in schedule (integer):
  count(/*/task)
(SAP) Name of first task:
  /*/task[1]/title
(SAP) Start date of first task:
  /*/task[1]/timing/within-date-range/@start
(SAP) Finish date of first task:
  /*/task[1]/timing/within-date-range/@end
(SAP) Optional Description of first task:
  /*/task[1]/description/node()
NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- In the OSCAL file, the start and end fields must use the OSCAL data type dateTime-with-timezone.
- The time may be entered as all zeros.
- For FedRAMP, a SAP tool should display only the date and ignore the time. The date should be presented to the user in a more user-friendly format.

4.7 SAP Rules of Engagement (ROE)

4.7.1 Origination Addresses

The scan origination IP address(es) are included in the `assessment-platform` assembly. See the next page for other disclosures.

Representation

```
<assessment-assets>
    <component type="hardware" uuid="BA991C3F-1E00-4C38-BF81-86A9E503F3B9">
        <title>Assessment Laptop</title>
    </component>
    <component uuid="040937c3-2e0e-407a-bb3c-d4e61ac1c460" type="software">
        <title>XYZ Vulnerability Scanning Tool</title>
    </component>
    <component uuid="c50104b9-69b3-4383-a1f1-d8a6f6f806f7" type="software">
        <title>XYZ Database Scanning Tool</title>
    </component>
    <assessment-platform uuid="60218FE9-B01A-4553-B705-DBE9DEC44AA1">
        <title>Scanning Tools</title>
        <prop name="ipv4-address" value="10.10.10.10"/>
        <prop name="ipv4-address" value="10.10.10.11"/>
        <prop name="ipv4-address" value="10.10.10.12"/>
        <uses-component component-uuid="BA991C3F-1E00-4C38-BF81-86A9E503F3B9" >
            <remarks><p>Cites assessment laptop.</p></remarks>
        </uses-component>
        <uses-component component-uuid="BA991C3F-1E00-4C38-BF81-86A9E503F3B9">
            <remarks><p>Cites assessment laptop.</p></remarks>
        </uses-component>
        <uses-component component-uuid="040937c3-2e0e-407a-bb3c-d4e61ac1c460">
            <remarks><p>Cites Vulnerability Scanning Tool</p></remarks>
        </uses-component>
        <uses-component component-uuid="c50104b9-69b3-4383-a1f1-d8a6f6f806f7">
            <remarks><p>Cites Database Scanning Tool</p></remarks>
        </uses-component>
    </assessment-platform>
</assessment-assets>
```

XPath Queries

```
(SAP) Count scan origination addresses (integer):
  count(/*/assessment-assets/assessment-platform/prop[@name='ipv4-address'])
(SAP) First scan origination address:
  /*/assessment-assets/assessment-platform/prop[@name='ipv4-address'][1]
NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- A SAP tool should present the scan origination addresses using the statement:
  "All scans will originate from the following IP address(es):", followed by the list of addresses.

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content, Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

7 Rules of Engagement

Instruction:

FedRAMP provides and recommends the Rules of Engagement (ROE), as listed in the section that follows. IAs must edit this ROE as necessary. The final version of the ROE must be signed by both an IA and CSP. See NIST SP 800-115, Appendix B, for further guidance.

Delete this instructional text from your final version of this document.

The ROE is a document designed to describe proper notifications and disclosures between an owner of a tested system and an IA. In particular, a ROE includes information about targets of automated scans and IP address origination information of automated scans (and other testing tools). Together with the information provided in preceding sections of this document, this document shall serve as a ROE once signed.

7.1 Disclosures

Any testing will be performed according to the terms and conditions, cited in this SAP and the Penetration Testing ROE, once this SAP is signed by both parties. These ROEs must be upheld to minimize risk exposure that could occur during security assessment testing.

The following sections provide additional disclosures accepted by the IA and the CSP for proceeding with this Security Assessment.

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.7.2 Disclosures

The scan origination IP address(es) are included in the `assessment-platform` assembly. See the next page for other disclosures`.

Representation

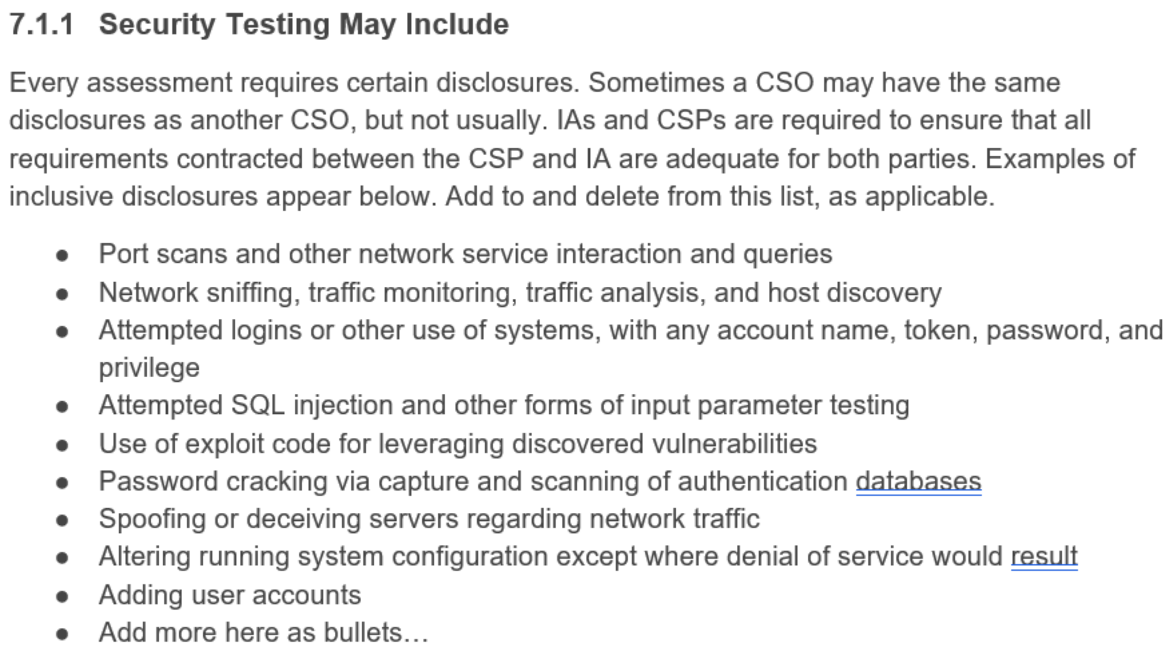
```
<terms-and-conditions>
    <part name="disclosures">
        <part name="disclosure">
            <prop name="sort-id" value="001"/>
            <p>Any testing will be performed according to terms and conditions designed
to minimize risk exposure that could occur during security testing.</p>
        </part>
        <part name="disclosure">
            <prop name="sort-id" value="002"/>
            <p>A disclosure statement</p>
        </part>
    </part>
</terms-and-conditions>
```

XPath Queries

```
(SAP) Count other disclosure statements (integer):
  count(/*/terms-and-conditions/part[@name='disclosures']/part[@name='disclosure'])

(SAP) Obtain Sort IDs, for sorting by the SAP tool:
  /*/terms-and-
  conditions/part[@name='disclosures']/part[@name='disclosure']/prop[@name='sort-id']

(SAP) The first assumption statement:
  /*/terms-and-
  conditions/part[@name='disclosures']/part[@name='disclosure']/prop[@name='sort-id']
  [string()='001']/../(* except prop)

NOTE: Replace '001' with '002', '003', etc. for each sort-id based on desired order.
```

NOTES:

- A SAP tool should present the scan origination addresses using the statement:
  "All scans will originate from the following IP address(es):", followed by the list of addresses.



7.1.1 Security Testing May Include

Every assessment requires certain disclosures. Sometimes a CSO may have the same disclosures as another CSO, but not usually. IAs and CSPs are required to ensure that all requirements contracted between the CSP and IA are adequate for both parties. Examples of inclusive disclosures appear below. Add to and delete from this list, as applicable.

- Port scans and other network service interaction and queries
- Network sniffing, traffic monitoring, traffic analysis, and host discovery
- Attempted logins or other use of systems, with any account name, token, password, and privilege
- Attempted SQL injection and other forms of input parameter testing
- Use of exploit code for leveraging discovered vulnerabilities
- Password cracking via capture and scanning of authentication databases
- Spoofing or deceiving servers regarding network traffic
- Altering running system configuration except where denial of service would result
- Adding user accounts
- Add more here as bullets…

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.7.3 Security Testing May Include

SAP authors should describe the security testing that may be included within the `terms-and-conditions` assembly, in the “included-activities” `part` and its “included-activity” sub-parts.

Representation

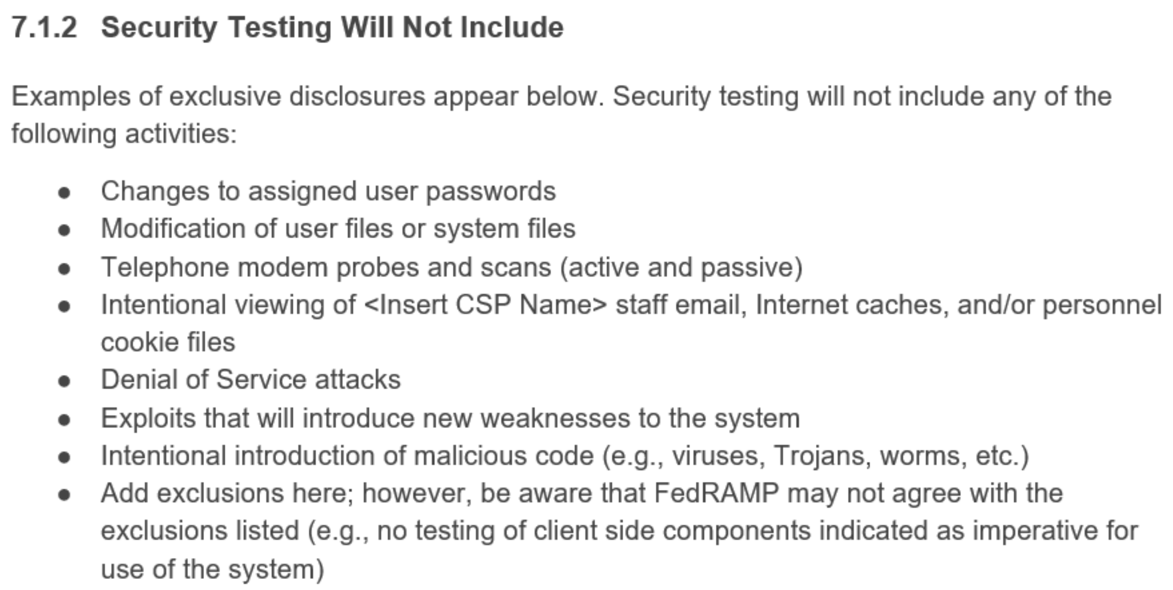
```
<terms-and-conditions>
    <part name="included-activities">
        <title>Included Activities</title>
        <p>The following activities are to be included as part of the FedRAMP
assessment.</p>
        <part name="included-activity">

        </part>
        <part name="included-activity">
            <p>Port scans and other network service interaction and queries</p>
        </part>
        <part name="included-activity">
            <p>Network sniffing, traffic monitoring, traffic analysis, and host
discovery</p>
        </part>
        <part name="included-activity">
            <p>Attempted logins or other use of systems, with any account
name/password</p>
        </part>
        <part name="included-activity">
            <p>Attempted structured query language (SQL) injection and other forms of
input
                parameter testing</p>
        </part>
        <!-- cut other included-activities -->
    </part>
</terms-and-conditions>
```

XPath Queries

```
(SAP) Number of Included Activities:
  count(/*/terms-and-conditions/part[@name='included-activities']/part[@name='included-
  activity'])
(SAP) First Included Activity:
  /*/terms-and-conditions/part[@name='included-activities']/part[@name='included-
  activity'][1]/node()
NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- An assessment tool should present a list of included activities with a preceding phrase such as, "Security testing may include the following activities:"



7.1.2 Security Testing Will Not Include

Examples of exclusive disclosures appear below. Security testing will not include any of the following activities:

- Changes to assigned user passwords
- Modification of user files or system files
- Telephone modem probes and scans (active and passive)
- Intentional viewing of <Insert CSP Name> staff email, Internet caches, and/or personnel cookie files
- Denial of Service attacks
- Exploits that will introduce new weaknesses to the system
- Intentional introduction of malicious code (e.g., viruses, Trojans, worms, etc.)
- Add exclusions here; however, be aware that FedRAMP may not agree with the exclusions listed (e.g., no testing of client side components indicated as imperative for use of the system)

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

4.7.4 Security Testing Will Not Include

SAP authors should describe exclusive disclosures within the `terms-and-conditions` assembly, in the “excluded-activities” `part` and its “included-activity” sub-parts.

Representation

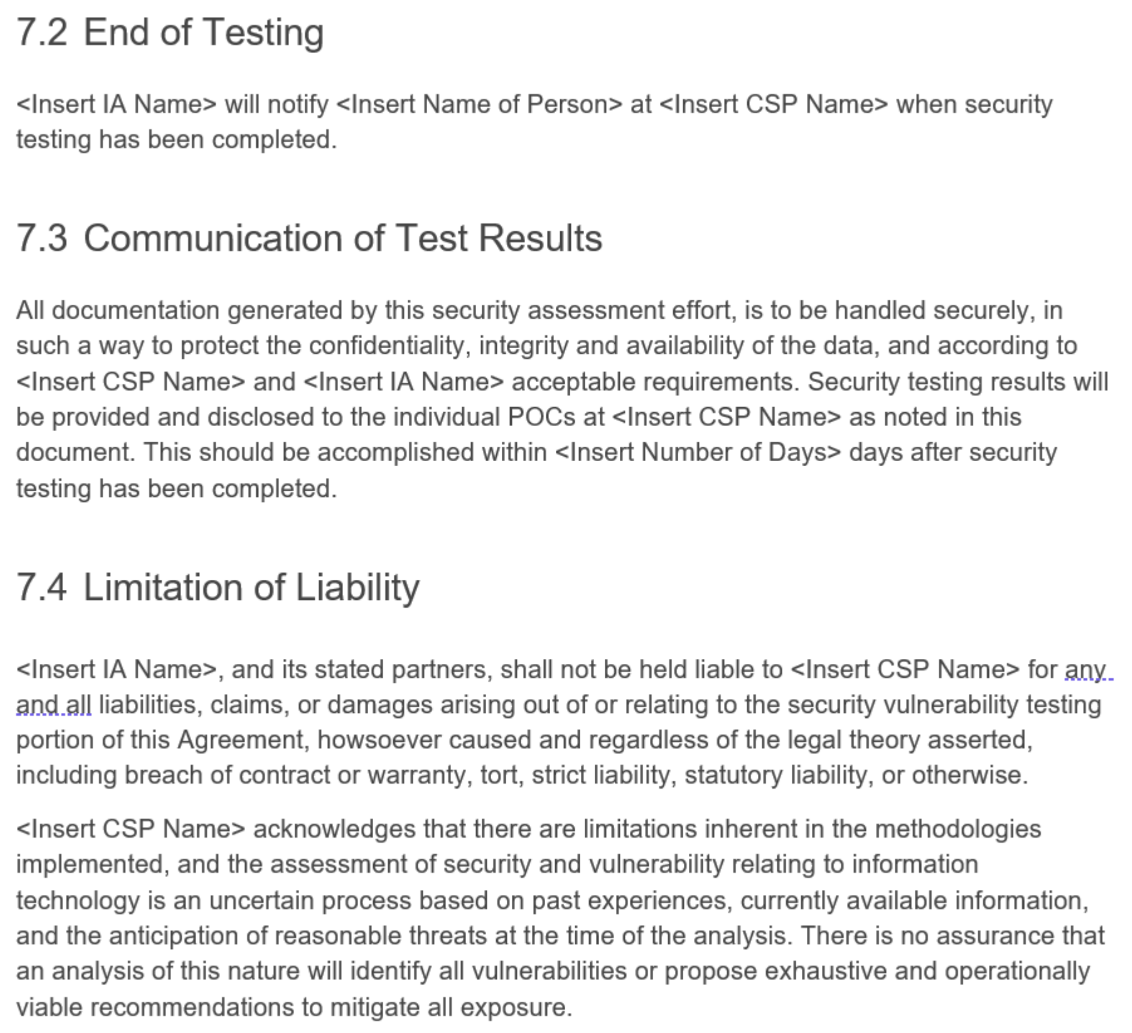
```
<terms-and-conditions>
    <part name="excluded-activities">
        <title>Excluded Activities</title>
        <p>The following activities are explicitly excluded from the assessment.</p>
        <part name="excluded-activity">
            <p>Changes to assigned user passwords</p>
        </part>
        <part name="excluded-activity">
            <p>Modification of user files or system files</p>
        </part>
        <part name="excluded-activity">
            <p>Telephone modem probes and scans (active and passive)</p>
        </part>
        <part name="excluded-activity">
            <p>Intentional viewing of [CSP Name] staff email, Internet caches, and/or
personnel
                cookie files</p>
        </part>
        <part name="excluded-activity">
            <p>Denial of service attacks</p>
        </part>
        <part name="excluded-activity">
            <p>Exploits that will introduce new weaknesses to the system</p>
        </part>
        <part name="excluded-activity">
            <p>Intentional introduction of malicious code (viruses, Trojans, worms,
etc.)</p>
        </part>
    </part>
    </terms-and-conditions>
```

XPath Queries

```
(SAP) Number of Excluded Activities:
  count(/*/terms-and-conditions/part[@name='excluded-activities']/part[@name='excluded-
  activity'])

(SAP) First Excluded Activity:
  /*/terms-and-conditions/part[@name='excluded-activities']/part[@name='excluded-
  activity'][1]/node()

NOTE: Replace [1] as needed with [2], [3], etc.
```

NOTES:

- An assessment tool should present a list of included activities with a preceding phrase such as, "Security testing will not include any of the following activities:"



7.2 End of Testing

<Insert IA Name> will notify <Insert Name of Person> at <Insert CSP Name> when security testing has been completed.

7.3 Communication of Test Results

All documentation generated by this security assessment effort, is to be handled securely, in such a way to protect the confidentiality, integrity and availability of the data, and according to <Insert CSP Name> and <Insert IA Name> acceptable requirements. Security testing results will be provided and disclosed to the individual POCs at <Insert CSP Name> as noted in this document. This should be accomplished within <Insert Number of Days> days after security testing has been completed.

7.4 Limitation of Liability

<Insert IA Name>, and its stated partners, shall not be held liable to <Insert CSP Name> for any and all liabilities, claims, or damages arising out of or relating to the security vulnerability testing portion of this Agreement, howsoever caused and regardless of the legal theory asserted, including breach of contract or warranty, tort, strict liability, statutory liability, or otherwise.

<Insert CSP Name> acknowledges that there are limitations inherent in the methodologies implemented, and the assessment of security and vulnerability relating to information technology is an uncertain process based on past experiences, currently available information, and the anticipation of reasonable threats at the time of the analysis. There is no assurance that an analysis of this nature will identify all vulnerabilities or propose exhaustive and operationally viable recommendations to mitigate all exposure.

4.7.5 End of Testing

This indicates who the Independent Assessor (IA) should notify within the CSP's organization when testing is complete.

Representation

```
<metadata>
    <role id="csp-end-of-testing-poc">
        <title>CSP's End of Testing Notification POC</title>
        <desc>A role for an individual within the CSP to be notified by the assessor
when testing is complete.</desc>
    </role>

    <!-- Only define CSP party in SAP when no appropriate party exits in SSP -->

    <responsible-party role-id="csp-end-of-testing-poc">
        <!-- At Least one -->
        <party-uuid>person-2</party-uuid>
    </responsible-party>
</metadata>
```

FedRAMP Defined Identifier

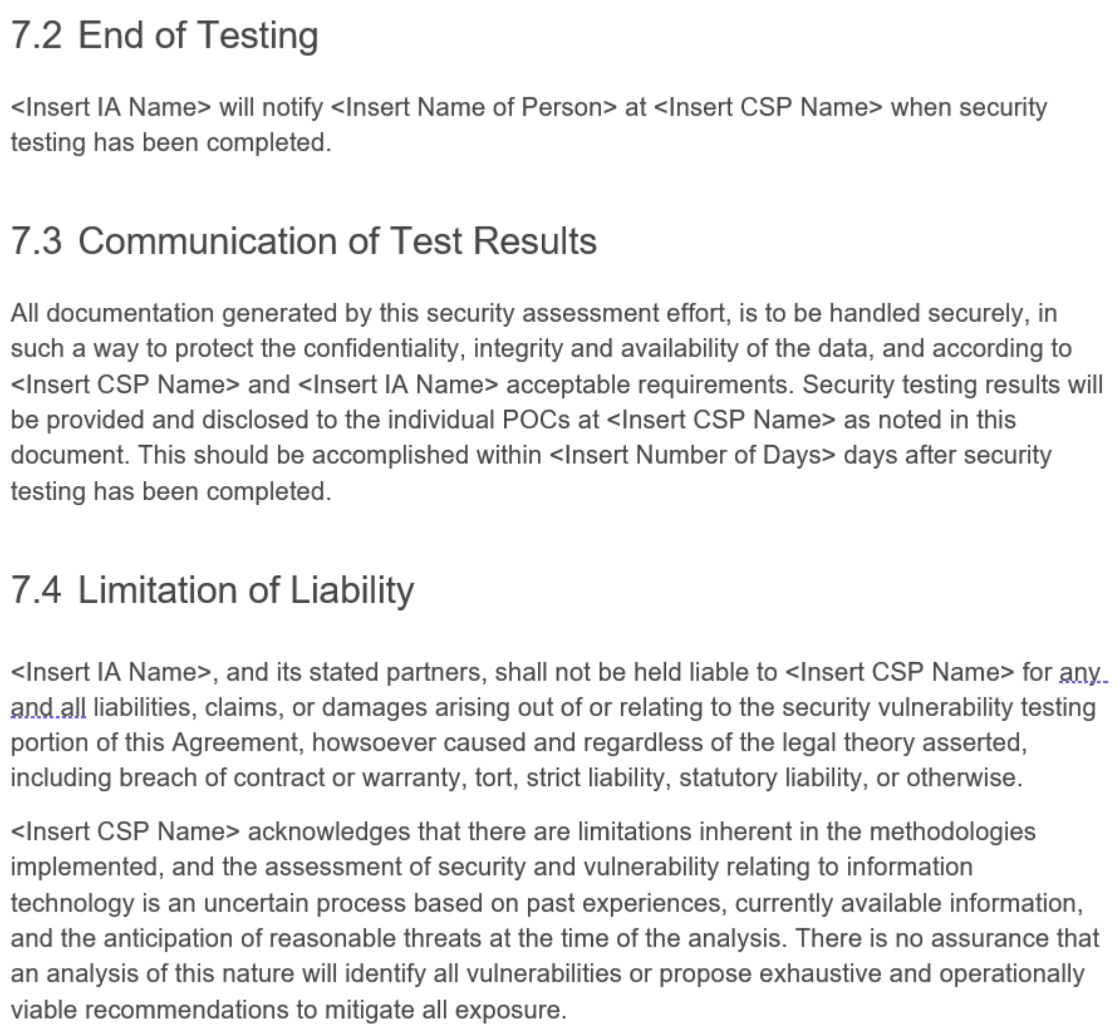
role ID: `csp-end-of-testing-poc`

XPath Queries

```
(SAP) Number of CSP Parties to notify at EOT (integer):
  count(/*/metadata/responsible-party[@role-id='csp-end-of-testing-poc']/party-uuid)
(SAP) ID of the first CSP Party to Notify:
  /*/metadata/responsible-party[@role-id='csp-end-of-testing-poc']/party-uuid[1]
NOTE: Replace [1] as needed with [2], [3], etc.
(SSP) Name of the first person or team:
  /*/metadata/party[@id='person-2']/(./person/person-name | ./org/org-name)
(SSP) Phone for the first person or team:
  /*/metadata/party[@id='person-2']//phone
(SSP) Email for the first person or team:
  /*/metadata/party[@id='person-2']//email
NOTE: Replace 'person-2' with each party-uuid found in the responsible role.
```

NOTES:

- IDs used for roles or parties in the SAP must not duplicate IDs used for roles or parties in the SSP.
- Only define a CSP party in the SAP when no appropriate party exists in the SSP.



7.2 End of Testing

<Insert IA Name> will notify <Insert Name of Person> at <Insert CSP Name> when security testing has been completed.

7.3 Communication of Test Results

All documentation generated by this security assessment effort, is to be handled securely, in such a way to protect the confidentiality, integrity and availability of the data, and according to <Insert CSP Name> and <Insert IA Name> acceptable requirements. Security testing results will be provided and disclosed to the individual POCs at <Insert CSP Name> as noted in this document. This should be accomplished within <Insert Number of Days> days after security testing has been completed.

7.4 Limitation of Liability

<Insert IA Name>, and its stated partners, shall not be held liable to <Insert CSP Name> for any and all liabilities, claims, or damages arising out of or relating to the security vulnerability testing portion of this Agreement, howsoever caused and regardless of the legal theory asserted, including breach of contract or warranty, tort, strict liability, statutory liability, or otherwise.

<Insert CSP Name> acknowledges that there are limitations inherent in the methodologies implemented, and the assessment of security and vulnerability relating to information technology is an uncertain process based on past experiences, currently available information, and the anticipation of reasonable threats at the time of the analysis. There is no assurance that an analysis of this nature will identify all vulnerabilities or propose exhaustive and operationally viable recommendations to mitigate all exposure.

4.7.6 Communication of Test Results

This indicates who the Independent Assessor (IA) should send all the assessment results to at the CSP's organization.

Representation

```
<metadata>
    <role id="csp-results-poc">
        <title>CSP Results POCs</title>
        <desc>A role for the individuals within the CSP who are to receive the
assessment results.</desc>
    </role>

    <!-- Only define CSP party in the SAP when no appropriate party exits in SSP -->

    <responsible-party role-id="csp-results-poc">
        <!-- One or More -->
        <party-uuid>person-1</party-uuid>
        <party-uuid>person-2</party-uuid>
    </responsible-party>
</metadata>
```

FedRAMP Defined Identifier

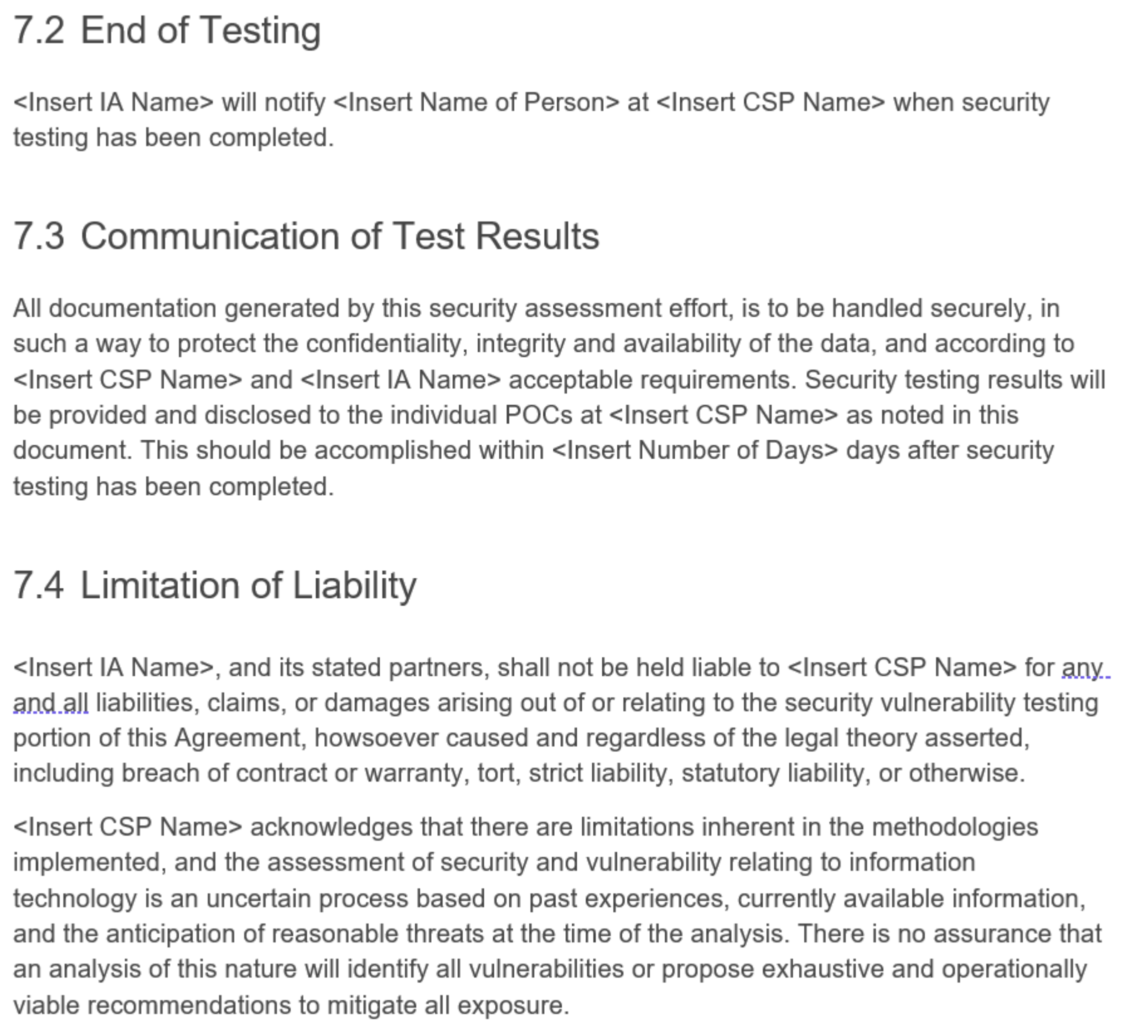
role ID: `csp-results-poc`

XPath Queries

```
(SAP) Number of CSP Test Result POCs (integer):
  count(/*/metadata/responsible-party[@role-id='csp-results-poc']/party-uuid)

(SAP) ID of the first CSP Assessment POC:
  /*/metadata/responsible-party[@role-id='csp-results-poc']/party-uuid[1]

NOTE: Replace [1] as needed with [2], [3], etc.

(SSP) Name of the first person or organization:
  /*/metadata/party[@id='person-1']/person/person-name

(SSP) Role/Title of the first person:
  /*/metadata/party[@id='person-1']/person/prop[@name='title']
  [@ns='https://fedramp.gov/ns/oscal']

(SSP) Phone for the first person or organization:
  /*/metadata/party[@id='person-1']//phone

(SSP) Email for the first person or organization:
  /*/metadata/party[@id='person-1']//email

NOTE: Replace 'person-1' with each party-uuid found in the responsible role.
```

NOTES:

- IDs used for roles or parties in the SAP must not duplicate IDs used for roles or parties in the SSP.
- Only define a CSP party in the SAP when no appropriate party exists in the SSP.



7.2 End of Testing

<Insert IA Name> will notify <Insert Name of Person> at <Insert CSP Name> when security testing has been completed.

7.3 Communication of Test Results

All documentation generated by this security assessment effort, is to be handled securely, in such a way to protect the confidentiality, integrity and availability of the data, and according to <Insert CSP Name> and <Insert IA Name> acceptable requirements. Security testing results will be provided and disclosed to the individual POCs at <Insert CSP Name> as noted in this document. This should be accomplished within <Insert Number of Days> days after security testing has been completed.

7.4 Limitation of Liability

<Insert IA Name>, and its stated partners, shall not be held liable to <Insert CSP Name> for any and all liabilities, claims, or damages arising out of or relating to the security vulnerability testing portion of this Agreement, howsoever caused and regardless of the legal theory asserted, including breach of contract or warranty, tort, strict liability, statutory liability, or otherwise.

<Insert CSP Name> acknowledges that there are limitations inherent in the methodologies implemented, and the assessment of security and vulnerability relating to information technology is an uncertain process based on past experiences, currently available information, and the anticipation of reasonable threats at the time of the analysis. There is no assurance that an analysis of this nature will identify all vulnerabilities or propose exhaustive and operationally viable recommendations to mitigate all exposure.

The `part` assembly includes *Markup multiline*, which enables the text to be formatted. This requires special handling.
See the *Guide to OSCAL-based FedRAMP Content*, *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: https://pages.nist.gov/OSCAL/reference/datatypes/#markup-multiline

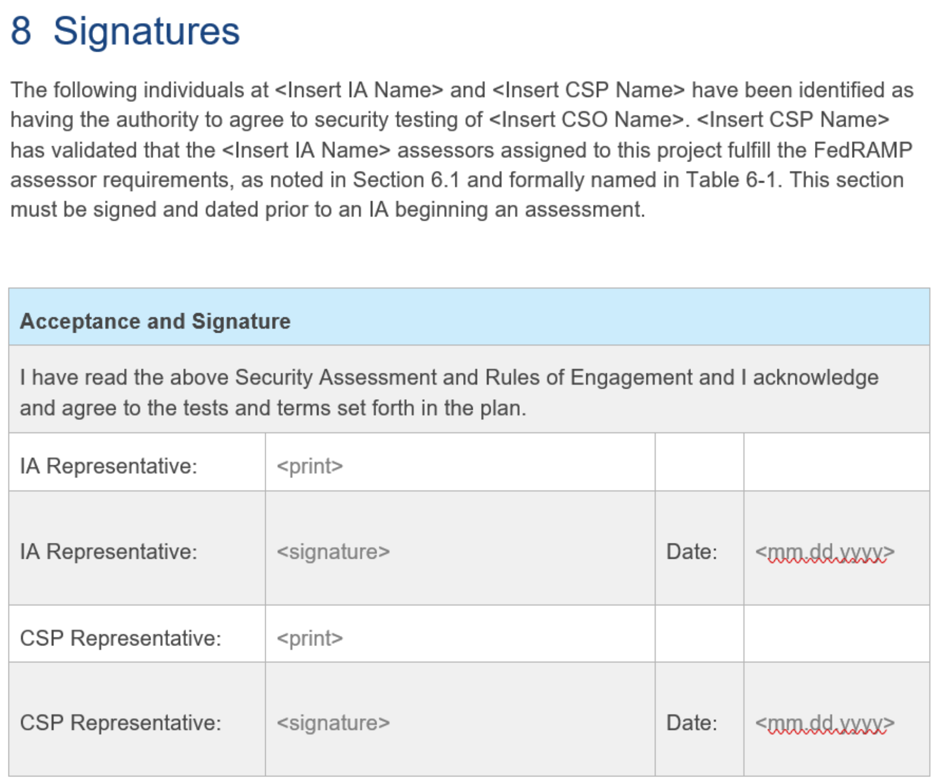
4.7.7 Limitation of Liability

Representation

```
<terms-and-conditions>
    <part name="liability-limitations">
        <title>FedRAMP Required Limitation of Liability Statements</title>
        <part name="liability-limitation">
            <prop name="sort-id" value="001"/>
            <p><insert type="param" id-ref="3pao_name_prm"/>, and its stated partners,
shall not be held liable to <insert type="param" id-ref="csp_name_prm"/>  for any and
all liabilities, claims, or damages arising out of or relating to the security
vulnerability testing portion of this agreement, howsoever caused and regardless of the
legal theory asserted, including breach of contract or  warranty, tort, strict
liability, statutory liability, or otherwise.</p>
        </part>
        <part name="liability-limitation">
            <prop name="sort-id" value="002"/>
            <p><insert type="param" id-ref="csp_name_prm"/> acknowledges that there are
limitations inherent in the methodologies implemented, and the assessment of security
and vulnerability relating to information technology is an uncertain process based on
past experiences, currently available information, and the anticipation of reasonable
threats at the time of the analysis. There is no assurance that an analysis of this
nature will identify all vulnerabilities or propose exhaustive and operationally viable
recommendations to mitigate all exposure.</p>
        </part>
    </part>
</terms-and-conditions>
```

XPath Queries

```
(SAP) Count individual limitations of liability statements (integer):
  count(/*/terms-and-conditions/part[@name='liability-limitations']/
  part[@name='liability-limitation'])
(SAP) Obtain Sort IDs, for sorting by the SAP tool:
  /*/terms-and-conditions/part[@name='liability-limitations']/part[@name='liability-
  limitation'] /prop[@name='sort-id']
(SAP) The first liability limitation statement:
  /*/terms-and-conditions/part[@name='liability-limitations']/part[@name='liability-
  limitation']/prop [@name='sort-id'] [string()='001']/../(* except prop)
NOTE: Replace '001' with '002', '003', etc. for each sort-id based on desired order.
```



8 Signatures

The following individuals at <Insert IA Name> and <Insert CSP Name> have been identified as having the authority to agree to security testing of <Insert CSO Name>. <Insert CSP Name> has validated that the <Insert IA Name> assessors assigned to this project fulfill the FedRAMP assessor requirements, as noted in Section 6.1 and formally named in Table 6-1. This section must be signed and dated prior to an IA beginning an assessment.

Acceptance and Signature			
I have read the above Security Assessment and Rules of Engagement and I acknowledge and agree to the tests and terms set forth in the plan.			
IA Representative:	<print>		
IA Representative:	<signature>	Date:	<mm.dd.yyyy>
CSP Representative:	<print>		
CSP Representative:	<signature>	Date:	<mm.dd.yyyy>

4.8 SAP Signatures

Using a machine-readable format such as OSCAL for SAP content creates a challenge in the handling of acceptance signatures. Early adopters are encouraged to approach the FedRAMP PMO to discuss specific solutions on a case-by-case basis. Until such time as the FedRAMP PMO and JAB have a well-established capability for handling signatures, one of the following approaches is encouraged:

- Manual "Wet" Signature Approach (Document or Letter)
- Digital Signature

Representation

```
<back-matter>
    <resource id="sap-signatures">
        <description><p>Signed SAP</p></description>
        <prop name='type' value='signed-sap'/>
        <!-- Use rlink and/or base64 -->
        <rlink href="./signed-sap.pdf" media-type="application/pdf" />
        <base64 filename="sap.pdf" media-type="application/pdf">00000000</base64>
    </resource>
</back-matter>
```

XPath Queries

```
(SAP) Link to signed SAP in PDF Format:
  /*/back-matter/resource/prop[@name='type'] [.='signed-sap']/../rlink/@href
(SAP) Base64-encoded signed SAP in PDF Format:
  /*/back-matter/resource/prop[@name='type'] [.='signed-sap']/../base64
```

4.8.1 Manual "Wet" Signature Approach (Document or Letter) Print, manually sign, scan, and attach.

1. Print one of the following:
   a. The OSCAL-based SAP content with a tool that renders the SAP in a format that resembles the MS-Word based FedRAMP SAP Template; or
   b. A separate letter, which uses the same language.
2. Have all parties manually sign the document or letter in ink.
3. Scan the signed copy.
4. Attach it to the OSCAL-based SAP as a resource.

4.8.2 Digital Signature Approach Render, digitally sign, and attach.

1. Render the OSCAL-based SAP content as a PDF that resembles the MS-Word based FedRAMP SAP Template.
2. Have all parties digitally sign the PDF document.
3. Attach it to the OSCAL-based SAP as a resource.

4.9 SAP Appendices

4.9.1 Security Controls Selection Worksheet

An OSCAL SAP must always explicitly select the in-scope controls from the applicable FedRAMP Baseline/Profile. See section 4.5 Controls Testing for additional guidance.

4.9.2 Test Case Procedures

The assessment objectives and actions (Examine, Interview, and Test) from the test case workbook are now part of the OSCAL-based FedRAMP baselines, with the detail imported from the OSCAL-based NIST SP 800-53 Catalog via the baseline.

SAP and SAR Tools should be able to render Test Case Workbook objectives and actions using the OSCAL-based FedRAMP Baselines and NIST Catalog.

4.9.2.1 Baseline Objectives and Methods

To include an assessment objective and associated actions in the SAP, its control must be designated in-scope as described in *Sections 4.1, Background*

The Background, *Purpose*, and *Applicable Laws* sections of the FedRAMP SAP template contain references to the CSP name, the CSO name, and the independent assessor (IA) name. The information in these sections may be represented as a `part` assembly within the `terms-and-conditions` element of an OSCAL SSP. This approach is optional as the specific data items can simply be queried from an OSCAL SAP and its associated documents.

Representation

```
<!-- cut -->

   <terms-and-conditions>
      <!-- Section 2 Background -->
      <part ns="https://fedramp.gov/ns/oscal" name="background">
         <title>Background</title>
         <p>Insert text from FedRAMP template</p>
         <p> Insert text from FedRAMP template </p>
         <part ns="https://fedramp.gov/ns/oscal" name="nist-sp800-39">
            <p> Insert text from FedRAMP template</p>
         </part>
         <!-- Section 2.1 -->
         <part ns="https://fedramp.gov/ns/oscal" name="purpose">
            <title>Purpose</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="001"/>
            <p>This SAP has been developed by [IA Name] and is for [an initial
assessment/an annual assessment/an annual assessment and significant change assessment/a
significant change assessment] of the [CSP Name], [CSO Name]. The SAP provides the goals
for the assessment and details how the assessment will be conducted.</p>
         </part>
         <!-- Section 2.2 -->
         <part ns="https://fedramp.gov/ns/oscal" name="laws-regulations" >
            <title>Applicable Laws, Regulations, Standards and Guidance</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="002"/>
            <p>The FedRAMP-applicable laws, regulations, standards and guidance is
included in the [CSO Name] SSP section - System Security Plan Approvals. Additionally,
in Appendix L of the SSP, the [CSP Name] has included laws, regulations, standards, and
guidance that apply specifically to this system.</p>
         </part>
      </part>
      <!-- cut -->
   </terms-and-conditions>
```

XPath Queries

```
(SAP) IA Name:
  /assessment-plan/metadata/party[@uuid="uuid-of-ia"]/name

(SAP) Initial assessment, annual assessment, or significant change?
  /assessment-plan/metadata/prop[@ns="https://fedramp.gov/ns/oscal" and
  @name="assessment-type"]/@value

(SAP) Are there no/one/many significant changes in SAP scope?
  /assessment-plan/metadata/prop[@ns="https://fedramp.gov/ns/oscal" and
  @name="significant-changes-scope"]/@value

(SAP) CSP Name:
  /assessment-plan/metadata/party[@uuid="uuid-of-csp"]/name

(SSP) CSO Name:
  /system-security-plan/system-characteristics/system-name
```

4.10 Scope

This information should come entirely from the imported SSP. If the OSCAL-based SSP exists and is accurate, the tool should query that file for this information as follows:

SSP XPath Queries

```
Table 2-1

(SSP) Unique Identifier:
  /*/system-characteristics/system-id[@identifier-type='https://fedramp.gov']

(SSP) Information System Name:
  /*/system-characteristics/system-name

(SSP) Information System Abbreviation:
  /*/system-characteristics/system-name-short
```

If no OSCAL-based SSP exists, as described in *Section 3.5.2, If No OSCAL-based SSP Exists (General)*, the resource with the `no-oscal-ssp` type must designate the system's identifier, name, and abbreviation.

NOTE:

The system's authorization date, purpose, and description have not historically been displayed in the SAP but must be present when the SAR references this content.

4.10.1 Location of Components

The SAP reference location information in the SSP using its ID and must explicitly cite each location within the scope of the assessment. While `all` is valid OSCAL syntax, FedRAMP requires locations to be explicitly cited, so that the assessor can add their own description of the location. Also, the SSP will likely also contain locations that are not data centers.

Representation

```
<assessment-subject type="location">
    <description>
        <p>A description of the locations.</p>
    </description>
    <include-subject subject-uuid="uuid-of-location-in-SSP-metadata" type="token">
        <remarks>
            <p>Briefly describe the components at this location.</p>
        </remarks>
    </include-subject>
    <include-subject subject-uuid="uuid-of-location-in-SAP-metadata" type="token">
        <remarks>
            <p>Briefly describe the components at this location.</p>
        </remarks>
    </include-subject>
</assessment-subject>
```

XPath Queries

```
(SSP) List the Data Center UUIDs in the SSP (Primary and Alternate):
  /*/metadata/location[prop[@name='type'][@value='data-center']]/@uuid

(SSP) List the Primary Data Center UUIDs in the SSP:
  /*/metadata/location[prop[@name='type'][@value='data-center'][@class='primary']]/@uuid

NOTE: For just alternate data centers, replace 'primary' with 'alternate'.
```

```
(SAP) Location UUID (First Location cited in SAP):
  /*/assessment-subject[@type='location']/include-subject[1]/@subject-uuid
NOTE: Replace "[1]" with "[2]", "[3]", etc.
(SSP) Data Center Site Name (Lookup in SSP, using ID cited in SAP):
  /*/metadata/location[@id='location-2']/prop[@name='title']
  [@ns='https://fedramp.gov/ns/oscal']
NOTE: Replace 'location-2' with the SSP location as cited in the SAP.
(SSP or SAP) Address:
  /*/metadata/location[@uuid='uuid-value-from-SAP']/address/addr-line
NOTE: Replace addr-line with city, state, and postal-code as needed.
  There may be more than one addr-line.
NOTE: Replace 'location-2' with the SSP location as cited in the SAP.


(SSP) CSP's Description of Location (from SSP):
  /*/metadata/location[@uuid='uuid-value-for-location-2']/remarks
(SAP) Assessor's Description of Components at the first location:
  /*/assessment-subject[@type='location']/include-subject[1]/remarks/node()
NOTE: Replace "[1]" with "[2]", "[3]", etc.
```

If no OSCAL-based SSP exists, or the location of components is not accurately reflected in the SSP, this information may be added to the SAP's `metadata` section using the same syntax as the SSP. The `include-subject` citations are still required as described above; however, the IDs point to the SAP's location data instead of the SSP's.

The same queries work as presented above; however, the queries are used in the SAP instead of the SSP.

4.10.2 IP Addresses Slated for Testing

The SAP references SSP content for this information. Each subnet should be represented in the SSP as a `component` with `type='subnet'`. If the SSP does not enumerate subnets in this way, the SAP tool should allow the assessor to add them to the SAP's `local-definitions` as components.

Beyond subnets, this section is an enumeration of the SSP's `inventory-item` assemblies, which always contain the hostname and IP address of the item. Other details, such as the software and version information, may be found in the inventory item itself or the SSP inventory item may be linked to an SSP component containing those details, depending on whether the SSP is using the legacy (flat) approach or the preferred component approach.

If the assessor needs to add missing component or inventory-item entries, or if the assessor needs to correct this information, the SAP tool must add this assessor-provided information to the SAP's local-definitions.

See the *Guide to OSCAL-based FedRAMP System Security Plans* to learn more about legacy (flat-file) and component-based inventory approaches. Use a combination of `include-subject` and `exclude-subject` assemblies to specify the SSP IDs of all in-scope components and inventory-items. Excluding items is typically used in association with the rules of engagement.

If an inventory-item is linked to a component in the SSP, the component is automatically within scope as this is often necessary to get the software and version information. Tools should honor this relationship and consider linked components to be implicitly in-scope even if the component was not explicitly cited in the SAP.

Representation

```
<assessment-subject type="component">
    <description><p>A description of the included component.</p></description>
    <include-all />
    <exclude-subject subject-uuid="uuid-of-SSP-component-to-exclude" type="token" />
</assessment-subject>

<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-all />
    <exclude-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
    <exclude-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
</assessment-subject>
<!-- OR -->
<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-include"
                     type="token" />
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-include"
                     type="token" />
    <include-subject subject-uuid="uuid-of-SSP-inventory-item-to-exclude"
                     type="token" />
</assessment-subject>
```

XPath Queries

```
(SAP) Should all inventory-items be included? (true/false):
  boolean(/*/assessment-subject[@type='inventory-item']/include-all)

NOTE: This means all inventory-items in the SSP's system-implementation as well as all
  inventory-items in the SAP's local definitions

(SAP) Get the first inventory-item UUID from the SAP:
  /*/assessment-subject[@type='inventory-item']/include-subject[1]/@subject-uuid

(SSP) Get Host Name from inventory-item in the SSP:
  /*/system-implementation/system-inventory/
  inventory-item[@uuid='uuid-value-from-above']/prop[@name='fqdn']
```

4.10.2.1 If No OSCAL-based SSP Exists or Has Inaccurate Information (IP Addresses)

If no OSCAL-based SSP exists, or the inventory information is not accurately reflected in the SSP, this information may be added to the SAP's `local-definition` section as described below. The `include-subject` citations are still required as described above; however, the UUIDs point to the SAP's local definitions instead of the SSP.

Representation

```
<local-definitions>
    <inventory-item uuid="uuid-value">
        <description>
            <p>A Windows laptop, not defined in the SSP inventory.</p>
        </description>
        <prop name="ipv4-address" value="10.1.1.99"/>
        <prop name="virtual" value="no"/>
        <prop name="public" value="no"/>
        <prop name="fqdn" value="dns.name"/>
        <prop name="mac-address" value="00:00:00:00:00:00"/>
        <prop name="software-name" value="Windows 10"/>
        <prop name="version" value="V 0.0.0"/>
        <prop name="asset-type" value="os"/>
        <!-- Use any needed prop allowed in an SSP inventory item  -->
    </inventory-item>

    <inventory-item uuid="uuid-value" asset-id="none">
        <description><p>A subnet not defined in the SSP inventory.</p></description>
        <prop name="ipv4-subnet">10.20.30.0/24</prop>
        <!-- Use any needed prop allowed in an SSP inventory item  -->
    </inventory-item>
</local-definitions>

<assessment-subject type="inventory-item">
    <description><p>Description of the included inventory.</p></description>
    <include-subject subject-uuid="uuid-of-SAP-inventory-item-to-include"
                     type="token" />
    <exclude-subject subject-uuid="uuid-of-SAP-inventory-item-to-include"
                     type="token" />
</assessment-subject>
```

XPath Queries

```
(SAP) Get the included ID the same way:
  /*/assessment-subject[@type='inventory-item']/include-subject[2]/@subject-uuid

(SAP) Get Subnet from inventory-item in the SAP:
  /*/local-definitions/inventory-item[@uuid='value-from-above']/prop[@name='ipv4-
  subnet']/@value
```

4.10.3 SAP Web Applications Slated for Testing

The SSP inventory data should already indicate which assets have a web interface, with the following FedRAMP extension:

```
<prop name="scan-type" ns="https://fedramp.gov/ns/oscal" value="web"/>
```

This typically appears in the `inventory-item` itself with the legacy approach and appears in a `component` associated with the `inventory-item` if the SSP is using the component-based approach. See the *Guide to OSCAL-based System Security Plans (SSP)* for details on the flat-file and component-based approaches.

FedRAMP expects the assessor to review and validate the list of identified web applications, both initially in the SAP and as a result of the discovery scans once the assessment begins. SAP tools should facilitate this review and adjustment of inventory data as needed for the assessor to properly identify all web applications for testing.

For every web interface to be tested, whether pre-identified in the SSP inventory or identified by the assessor, there must be a `task` entry. If the inventory-item already contains the `login-url`, the tool should duplicate it here. If not, the tool should enable the assessor to add it here. A SAP tool should also enable the assessor to add a `login-id` for test users here. Both use FedRAMP extensions.

Representation

```
<local-definitions>
    <activity uuid="uuid-of-web-application-activity">
        <title>Web Application Test #1</title>
        <description><p>Describe this web application test.</p></description>
        <prop name="type" ns="https://fedramp.gov/ns/oscal" value="web-application"/>
    </activity>
</local-definitions>
<!-- cut: terms-and-conditions, reviewed-controls, assessment-subject -->
<task uuid="task-uuid-value">
    <title>Web Application Tests</title>
    <task uuid="uuid-value">
        <title>Web Application Test #1</title>
        <prop name="type" ns="https://fedramp.gov/ns/oscal" value="web-application"/>
        <prop name="login-url" ns="https://fedramp.gov/ns/oscal"
              value="https://service.offering.com/login"/>
        <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-user"/>
        <associated-activity activity-uuid="uuid-of-web-application-activity">
            <subject type="inventory-item">
                <include-subject subject-uuid="uuid-of-SSP-inventory-item"
                                 type="inventory-item" />
            </subject>
        </associated-activity>
    </task>
</task>
```

XPath Queries

```
(SAP) Login URL:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[1]/prop[@name='login-url'][@ns="https://fedramp.gov/ns/oscal"]
(SAP) Login ID:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[1]/prop[@name='login-id'][@ns="https://fedramp.gov/ns/oscal"]
(SAP) Inventory-ID of host:
  (/*//task[prop[@name='type'][@ns="https://fedramp.gov/ns/oscal"][@value='web-
  application']])[2]/ associated-activity/subject[@type='inventory-item']/include-
  subject/@subject-uuid
NOTE: Replace "[2]" with "[2]", "[3]", etc.
REMEMBER: The inventory-item could be in the SSP's system-implementation or the SAP's
  local-definitions.
```

4.10.4 SAP Databases Slated for Testing

The SSP inventory data should already indicate which assets are a database, with the following FedRAMP extension:

```
<prop name="scan-type" ns="https://fedramp.gov/ns/oscal" value="database"/>
```

This typically appears in the `inventory-item` itself with the legacy (flat-file) approach and appears in a `component` associated with the `inventory-item` if the SSP is using the component-based approach. See the *Guide to OSCAL-based System Security Plans (SSP)* for details on the flat-file and component-based approaches.

FedRAMP expects the assessor to review and validate the list of identified databases, both initially in the SAP and as a result of discovery scans once the assessment begins. SAP tools should facilitate this review and adjustment of inventory data as needed for the assessor to properly identify all databases for testing.

XPath Queries

```
(SSP) Host name of first database in SSP(flat file approach):
  (/*/system-implementation/system-inventory/inventory-item/prop[@name='scan-
  type'][string()='database'])[1]/../prop[@name='fqdn']
(SSP) Host name of the first database in SSP (component approach) [xPath 2.0+ only]:
  (let $key:=/*/system-implementation/component[prop [@name='scan-type']
  [@ns='https://fedramp.gov/ns/oscal']='database']/@id return /*/system-
  implementation/system-inventory/inventory-item [implemented-component/@component-
  id=$key]/prop[@name='fqdn'])[1]
```

4.2.5.1 If No OSCAL-based SSP Exists or Has Inaccurate Information (Database)

If no OSCAL-based SSP exists, or an item is missing completely from the SSP inventory, it should have already been added as described in *Section 4.2.2.1, If No OSCAL-based SSP Exists or Has Inaccurate Information (IP* Addresses).

If a pre-existing SSP inventory item fails to properly identify a database, the tool should enable the assessor to add this designation with an entry in the SAP `local-definitions`, except the value `database` should be used instead of `web` for the scan-type.

4.10.5 Roles Testing Inclusions and Exclusion

Historically, FedRAMP assessors often identified generalized roles for testing, such as "internal", "external", and "privileged" rather than citing the specific roles enumerated in the SSP. This is in response to a FedRAMP requirement to test roles from each perspective. Assessors must ensure all roles are included for testing and identify roles excluded from testing. When processing an OSCAL SAP, SAP tools should present assessors with the roles from the associated (`import-ssp`) SSP so the assessor can select specific roles for testing. SAP tools should allow the assessor to easily identify roles that are excluded. Section 6.2 of the *Guide to OSCAL-based System Security Plans (SSP)* describes personnel roles and privileges with examples illustrating how to identify them in an OSCAL SSP. If the "roles" slated for testing exist in the SSP, the SSP roles are referenced from the SAP using their SSP IDs as defined in the SSP `user` assemblies in the `system-implementation` section of the OSCAL-based SSP file. **Note that in this case, the SAP role must actually map to the `uuid` of the `user` assembly in the SSP**.

Assessors should ensure the selection of at least one SSP-defined role from each of the common generalized role categories (“internal”, “external”, and “privileged”). If the assessor elects to reference more generic roles, the SAP tool should enable the assessor to create these generic roles locally in the SAP `local-definitions` assembly.

Representation

```
<local-definitions>
    <!—add user assembly for each role to be assessed →
    <user uuid=”uuid-value”>
        <title>Assessor Specified Role</title>
        <prop name=”sensitivity” ns=”https://fedramp.gov/ns/oscal” value=”limited” />
        <prop name=”type” value=”external”/>
        <prop name=”privilege-level” value=”no-logical-access” />
        <role-id>id-for-assessor-specified-role</role-id>
        <authorized-privilege>
            <title>Full administrative access (root)</title>
            <function-performed>Add/remove users and hardware</function-performed>
            <function-performed>install and configure software</function-performed>
            <function-performed>OS updates, patches and hotfixes</function-performed>
            <function-performed>perform backups</function-performed>
        </authorized-privilege>
    </user>
</local-definitions>
```

For every role to be tested, whether pre-identified in the SSP or identified by the assessor, there must be an `assessment-subject` entry, and at least one corresponding `task`. A SAP tool should enable the assessor to add a test user ID here via FedRAMP extension properties.

Representation

```
<assessment-plan>
    <!-- cut metadata -->
    <!-- cut import-ssp, local-definitions, terms-and-conditions, reviewed-controls -->
    <!-- set type to 'user' -->
    <assessment-subject type="user">
        <description>
            <p>A description of the included roles.</p>
            <p>A description of an excluded role.</p>
        </description>
        <!-- uuid from SSP or SAP lcocal-definitions -->
        <include-subject subject-uuid="user-uuid-from-SSP" type="token" />
        <exclude-subject subject-uuid="user-uuid-from-SSP" type="token" />
    </assessment-subject>
    <!-- cut assessment-assets -->
    <task uuid="task-uuid" type="action">
        <title>Role-Based Tests</title>
        <task uuid="test1-uuid" type="action">
            <title>Role Based Test #1</title>
            <prop name="test-type"
                      ns="https://fedramp.gov/ns/oscal" value="role-based"/>
            <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-user"/>
            <!-- uuid from SSP or SAP lcocal-definitions -->
            <prop name="user-uuid"
                      ns="https://fedramp.gov/ns/oscal"
                  value="user-uuid-value"/>
            <associated-activity activity-uuid="uuid-of-role-testing-activity" />
        </task>
        <task uuid="test2-uuid" type="action">
            <title>Role Based Test #2</title>
            <prop name="test-type" ns="https://fedramp.gov/ns/oscal"
                  value="role-based"/>
            <prop name="login-id" ns="https://fedramp.gov/ns/oscal" value="test-admin"/>
            <!-- uuid from SSP or SAP lcocal-definitions -->
            <prop name="user-uuid" ns="https://fedramp.gov/ns/oscal"
                  value="user-uuid-value"/>
            <associated-activity activity-uuid="uuid-of-role-testing-activity" />
        </task>
    </task>
    <!-- cut back-matter -->
</assessment-plan>
```

.

4.11 SAP Assumptions

SAP Assumptions use syntax similar to OSCAL control catalog statements. They have a sort-id, which a tool can use to ensure the intended sequence is maintained.

The `insert` elements can be used by tool developers as insertion points for data items that the tool may manage as parameters. The use of `insert` within an OSCAL `part` is described on the NIST OSCAL Concepts page.

Representation

```
<terms-and-conditions>
    <part name="assumptions">
        <part name="assumption">
            <prop name="sort-id" value="001"/>
            <p>This SAP is based on <insert type="param" id-ref="cso_name_prm"/>...</p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="002"/>
            <p>The <insert type="param" id-ref="csp_name_prm"/> ... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="003"/>
            <p>The <insert type="param" id-ref="ia_name_prm"/> ... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="004"/>
            <p>The <insert type="param" id-ref="csp_name_prm"/>... </p>
        </part>
        <part name="assumption">
            <prop name="sort-id" value="005"/>
            <p>Security controls that ... on these security controls.</p>
        </part>
    </part>
</terms-and-conditions>
```

XPath Queries

```
(SAP) Obtain Sort IDs, for sorting by the SAP tool:
  /*/terms-and-conditions/part[@name='assumptions']/
  part[@name='assumption']/prop[@name='sort-id']

(SAP) The first assumption statement:
  /*/terms-and-conditions/part[@name='assumptions']/
  part[@name='assumption']/prop[@name='sort-id'] [.='001']/../(* except prop)

NOTE: Replace '001' with '002', '003', etc. for each sort-id based on desired order.
```

NOTES:

- If the tool is using XPath 1.0 or 2.0, the tool must sort the results of the sort-id list, and then obtain the assumptions in the intended sequence. XPath 3.0 has a sort function, which can perform the sort for the tool.
- OSCAL does not support the insertion of values within Markup Multiline at this time. The tool must either replace each "[CSP Name]" and "[3PAO Name]" with the appropriate value or enable the assessor to manually make those changes. This feature may be added to future version of OSCAL.

4.12 SAP Methodology

In general, the methodology is simply a single markup multiline field, which enables the assessor to modify the content using rich text formatting. The FedRAMP SAP template includes subsections for *Control Testing, Data Gathering, Sampling,* and *Penetration Test*. Each of these sections must be present in the FedRAMP OSCAL SAP `terms-and-condition` assembly, within `part` named "methodology" as sub-parts. The subparts are specifically defined for FedRAMP SAP, so they have namespace “https://fedramp.gov/ns/oscal” and attributes are named “control-testing”, “data-gathering”, “sampling”, and “pen-testing”.

Representation

```
<terms-and-conditions>
      <!-- Section 5 -->
      <part name="methodology">
         <title>Methodology</title>
         <!-- Section 5.1 Control Testing -->
         <part ns="https://fedramp.gov/ns/oscal" name="control-testing">
            <title>Control Testing</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="001"/>
            <p>[IA Name] will ... </p>
         </part>
         <!-- Section 5.2 Data Gathering -->
         <part ns="https://fedramp.gov/ns/oscal" name="data-gathering">
            <title>Data Gathering</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="002"/>
            <p>[IA Name] data gathering activities will ... </p>
         </part>
         <!-- Section 5.3 Sampling -->
         <part ns="https://fedramp.gov/ns/oscal" name="sampling">
            <title>Sampling</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="003"/>
            <prop ns="https://fedramp.gov/ns/oscal" name="sampling" value="no"/>
            <p>The sampling methodology for evidence/artifact gathering, related to
controls assessment, is described in Appendix B.</p>
            <p>[IA Name] [will/will not] ... </p>
          </part>
         <!-- Section 5.4 Penetration Test -->
         <part ns="https://fedramp.gov/ns/oscal" name="pen-testing">
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="004"/>
            <p>The Penetration Test Plan and Methodology is attached in Appendix C.</p>
         </part>
      </part>
     <!-- cut -->
</terms-and-conditions>
```

FedRAMP requires the presence of the `sampling` property, which indicates whether sampling will be used by the assessor for the assessment. The `insert` elements can be used by tool developers for insertion points for data items that the tool may manage as parameters. CSP tools must display a definitive statement based on the value of the `sampling` property.

Representation

```
<terms-and-conditions>
      <!-- Section 5 -->
      <part name="methodology">
         <title>Methodology</title>

         <!-- Section 5.3 Sampling -->
         <part ns="https://fedramp.gov/ns/oscal" name="sampling">
            <title>Sampling</title>
            <prop ns="https://fedramp.gov/ns/oscal" name="sort-id" value="003"/>
            <prop ns="https://fedramp.gov/ns/oscal" name="sampling" value="no"/>
            <p>The sampling methodology for evidence/artifact gathering, related to
controls assessment, is described in Appendix B.</p>
            <p>[IA Name] [will/will not] ... </p>
          </part>

      </part>
     <!-- cut -->
</terms-and-conditions>
```

XPath Queries

```
(SAP) Will the assessor use sampling?:
  /*/terms-and-conditions/part[@name='methodology']/prop[@name='sampling']/@value

(SAP) Methodology Description:
  /*/terms-and-conditions/part[@name='methodology']/(* except prop)
```

NOTES:

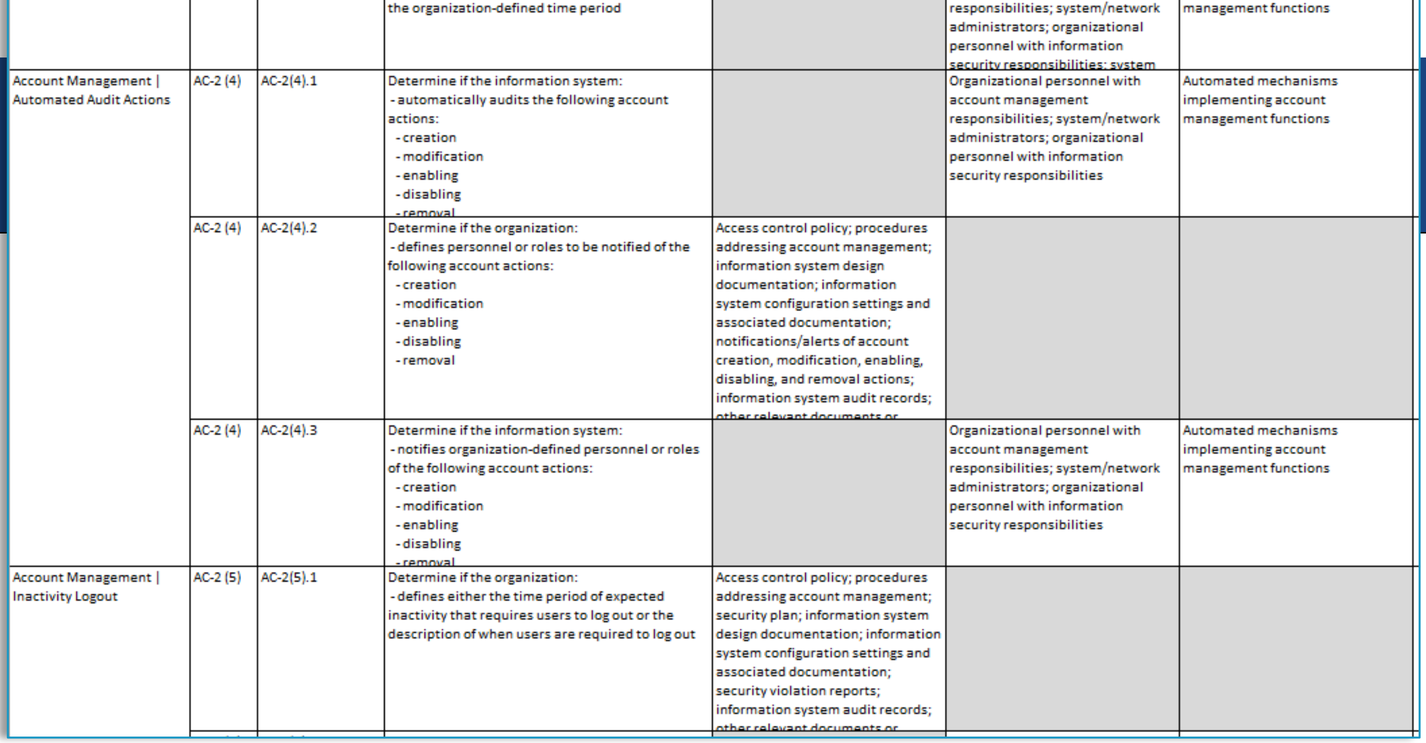
- The SAP tool should provide the assessor with an automated way to replace [CSP Name] and [3PAO Name] with the actual names of those parties.
- The SAP tool should allow the assessor to modify this content as needed.

. SAP tools should support and enforce this constraint.

In most cases, a FedRAMP assessor must adopt these without change. In this case, a SAP tool may simply specify all, to indicate that all assessment objectives should be included for all in-scope controls. If needed, objectives can be explicitly included or excluded as well.

Representation

```
<reviewed-controls>
    <control-selection>
        <description><h1>Control Scope</h1></description>
        <include-all />
        <exclude-control control-id="ac-1" />
    </control-selection>
    <control-objective-selection>
        <description><h1>Control Objective Scope</h1></description>
        <include-all />
        <!-- OR -->
        <include-objective objective-id="ac-1.a.1_obj.1" />
        <include-objective objective-id="ac-1.a.1_obj.2" />
        <include-objective objective-id="ac-1.a.1_obj.3" />
        <include-objective objective-id="ac-1.a.2_obj.1" />
        <include-objective objective-id="ac-1.a.2_obj.2" />
        <include-objective objective-id="ac-1.a.2_obj.3" />
        <include-objective objective-id="ac-1.b.1_obj.1" />
        <include-objective objective-id="ac-1.b.1_obj.2" />
        <include-objective objective-id="ac-1.b.2_obj.1" />
        <include-objective objective-id="ac-1.b.2_obj.2" />
    </control-objective-selection>
</reviewed-controls>
```



			the organization-defined time period		responsibilities; system/network administrators; organizational personnel with information security responsibilities; system	management functions
Account Management | Automated Audit Actions	AC-2 (4)	AC-2(4).1	Determine if the information system: - automatically audits the following account actions: - creation - modification - enabling - disabling - removal		Organizational personnel with account management responsibilities; system/network administrators; organizational personnel with information security responsibilities	Automated mechanisms implementing account management functions
	AC-2 (4)	AC-2(4).2	Determine if the organization: - defines personnel or roles to be notified of the following account actions: - creation - modification - enabling - disabling - removal	Access control policy; procedures addressing account management; information system design documentation; information system configuration settings and associated documentation; notifications/alerts of account creation, modification, enabling, disabling, and removal actions; information system audit records; other relevant documents or		
	AC-2 (4)	AC-2(4).3	Determine if the information system: - notifies organization-defined personnel or roles of the following account actions: - creation - modification - enabling - disabling - removal		Organizational personnel with account management responsibilities; system/network administrators; organizational personnel with information security responsibilities	Automated mechanisms implementing account management functions
Account Management | Inactivity Logout	AC-2 (5)	AC-2(5).1	Determine if the organization: - defines either the time period of expected inactivity that requires users to log out or the description of when users are required to log out	Access control policy; procedures addressing account management; security plan; information system design documentation; information system configuration settings and associated documentation; security violation reports; information system audit records; other relevant documents or		

XPath Queries

```
(SAP) Include All Objectives for in-scope controls? (true or false):
  boolean(/*/reviewed-controls/control-objective-selection/include-all)
(SAP) Exclude Controls Specified? (true or false):
  boolean(/*/objectives/control-objectives/exclude-objective)
(SAP) Exclude Objectives Total (integer):
  count(/*/objectives/control-objectives/exclude-objective)
(SAP) Exclude Specific Objective (string):
  /*/objectives/control-objectives/exclude-objective[1]/@objective-id
                                                  Replace "[1]" with "[2]", "[3]", etc.

NOTE: Replace "exclude-objective" with "include-objective" above for any explicitly
  included objective; however, this is redundant when used with 'all'.
```

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4.12.1.1 Sampling Methodology

The sampling methodology may continue to be a separate, attached document. This should be provided as a `back-matter` resource, containing a FedRAMP “type” prop with an allowed value, `sampling-methodology`.

Representation

```
<back-matter>
    <resource uuid="uuid">
         <title>Sampling Methodology</title>
         <description>
            <p>Embed or reference copies of the sampling methodology for security
controls assessment and vulnerability scanning (if applicable).</p>
         </description>
         <prop ns="https://fedramp.gov/ns/oscal" name="type"
               value="sampling-methodology"/>
         <!-- Use rlink and/or base64 -->
         <rlink href="./sampling-methodology-reference-1.pdf"
                media-type="application/pdf"/>
         <rlink href="./sampling-methodology-reference-2.docx"
                media-type="application/msword"/>
    </resource>
<back-matter>
```

FedRAMP Allowed Value

- `sampling-methodology`

XPath Queries

```
(SAP) Link to Sampling Methodology:
  /*/back-matter/resource/prop[@name='type'] [@value='sampling-
  methodology']/../rlink/@href
(SAP) Base64-encoded Sampling Methodology:
  /*/back-matter/resource/prop[@name='type'] [@value=''sampling-methodology
  ']/../base64
```

4.12.2 SAP Penetration Testing Plan and Methodology

The penetration test plan methodology may continue to be a separate, attached document. This should be provided as a `back-matter` resource, containing a FedRAMP “type” prop with an allowed value, `penetration-test-plan`.

Representation

```
<back-matter>
    <resource uuid="uuid">
         <title>Penetration Testing Plan and Methodology</title>
         <description>
            <p> . . . /p>
            <!-- update the table to reflect the attack vectors, threat models,
                 and attack models being assessed. -->
            <table>
               <tr>
                  <th>Include</th>
                  <th>Mandatory Attack Vectors</th>
                  <th>Include</th>
                  <th>Threat Models</th>
                  <th>Include</th>
                  <th>Attack Models</th>
               </tr>
               <tr>
                  <td>x</td>
                  <td>External to Corporate</td>
                  <td></td>
                  <td>Internet based (untrusted)</td>
                  <td></td>
                  <td>Enterprise</td>
               </tr>
               <tr> . . . </tr>
            </table>
         </description>
         <prop ns="https://fedramp.gov/ns/oscal" name="type"
               value="penetration-test-plan"/>
         <!-- Use rlink and/or base64 -->
         <rlink href="./pen_test_plan.pdf" media-type="application/pdf"/>
         <base64 filename="pen_test_plan.pdf"
                 media-type="application/pdf">00000000</base64>

    </resource>
<back-matter>
```

FedRAMP Allowed Value

- penetration-test-plan

XPath Queries

```
(SAP) Link to Penetration Test Plan:
  /*/back-matter/resource/prop[@name='type'] [@value='penetration-test-
  plan']/../rlink/@href

(SAP) Base64-encoded Penetration Test Plan:
  /*/back-matter/resource/prop[@name='type'] [@value='penetration-test-
  plan']/../base64
```

4.12.3 Significant Change Documentation

The significant change documentation must be provided as a `back-matter` resource, containing a FedRAMP “type” prop with an allowed value, `significant-change-request`.

Representation

```
<back-matter>
<!-- Significant Change Request Documentation -->
      <resource uuid="c965ffb0-cd67-4a80-9014-0c7a217c1f85">
         <title>Significant Change Request Documentation</title>
         <description>
            <p><tr> . . . </tr></p>
            <!-- Add table of additional roles -->
            <table>
               <tr>
                  <th>Role Name</th>
                  <th>Test User ID</th>
                  <th>Associated Functions</th>
               </tr>
               <tr> . . . </tr>
            </table>
         </description>
         <prop ns="https://fedramp.gov/ns/oscal" name="type"
               value="significant-change-request"/>
         <!-- Use rlink and/or base64 -->
         <rlink href="./fedramp_scr_form.pdf" media-type="application/pdf"/>
         <rlink href="./scr_inventory.xlsx" media-type="application/vnd.ms-excel"/>
         <rlink href="./other_scr_files.zip" media-type="application/zip"/>
      </resource>

<back-matter>
```

FedRAMP Allowed Value

- `significant-change-request`

XPath Queries

```
(SAP) Link to Significant Change Documentation:
  /*/back-matter/resource/prop[@name='type'] [@value=' significant-change-request
  ']/../rlink/@href

(SAP) Base64-encoded Significant Change Documentation:
  /*/back-matter/resource/prop[@name='type'] [@value= significant-change-request
  ']/../base64
```

5 Generated Content

The following artifacts are historically generated by hand to summarize content found in other FedRAMP-required content. When using OSCAL, these artifacts can be generated from content found elsewhere. This includes the:

- **IP Addresses Slated for Testing**
- **Databases Slated for Testing**
- **Test Case Workbook**

If delivering FedRAMP content in OSCAL, assessors are no longer required to manually generate and maintain these artifacts, provided the content in their OSCAL-based FedRAMP SAP and the CSP's OSCAL-based FedRAMP SSP remains accurate.

There are many ways a tool developer can generate these artifacts. FedRAMP is developing Extensible Stylesheet Language Transformation (XSLT) files to generate them. When ready, FedRAMP will make this freely available to the public here:

https://github.com/GSA/fedramp-automation/tree/master/dist/content/resources

Tool developers are also encouraged to develop their own solutions to generating this content.

5.1 Generating the "IP Addresses Slated for Testing" List

The SAP must still identify the in-scope inventory items - either by reference or using the "all" clause. Once identified, the list of IP addresses slated for testing should be derived from the machine-readable inventory found in the SSP.

As described in *Section 4.2.2.1, If No OSCAL-based SSP Exists or Has Inaccurate Information (IP* Addresses), if the assessor finds SSP information inventory to be missing or inaccurate, the SAP tool must allow the assessor to insert inventory information into the `local-definitions` section of the SAP.

5.2 Generating the "Databases Slated for Testing" List

The SAP must still identify the in-scope inventory items - either by reference or using the "all" clause. Once identified, the list of Databases slated for testing should be derived from the machine-readable inventory found in the SSP.

As described in *Section 4.2.2.1, If No OSCAL-based SSP Exists or Has Inaccurate Information (IP* Addresses), if the assessor finds SSP information inventory to be missing or inaccurate, the SAP tool must allow the assessor to insert inventory information into the `local-definitions` section of the SAP.